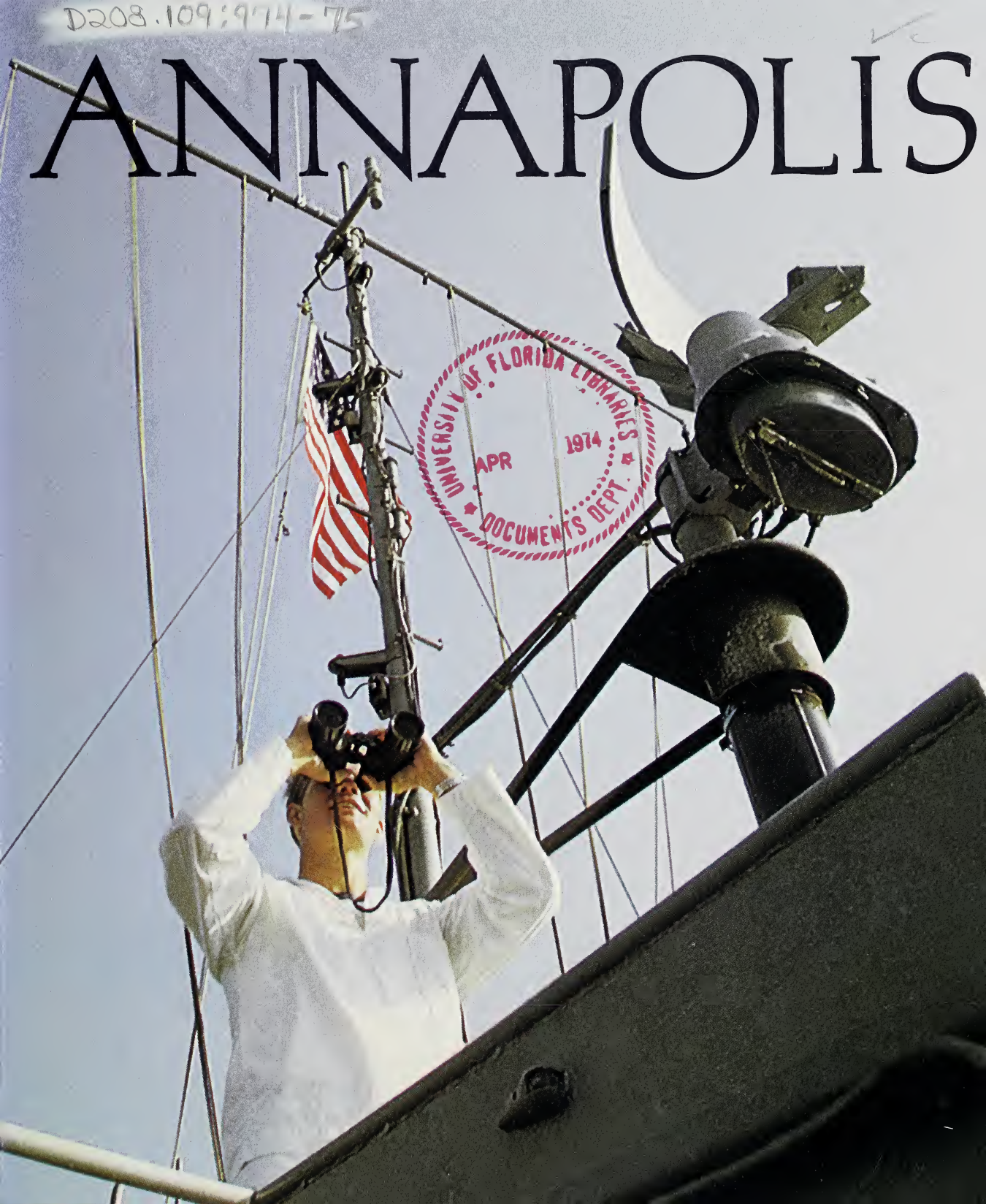


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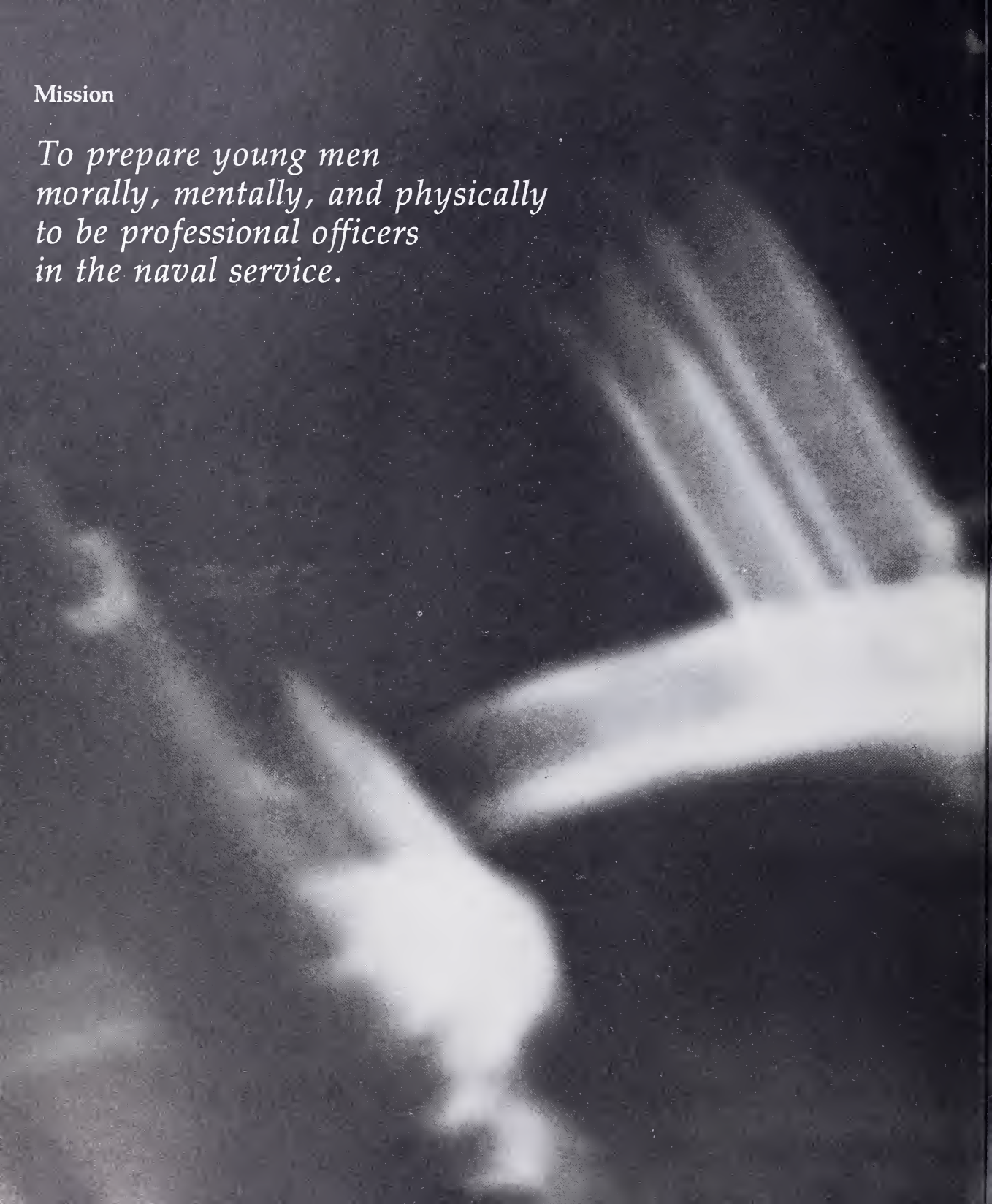
The United States Naval Academy Catalog 1974-75



Annapolis, Maryland

Mission

*To prepare young men
morally, mentally, and physically
to be professional officers
in the naval service.*

A dramatic, high-contrast black and white photograph of a ship's wake at night. The image shows a large, bright, white wake trailing behind a ship, with several distinct, parallel streaks of light cutting through the dark water. The overall mood is powerful and dynamic, suggesting speed and direction.





It's Your Decision

As a prospective candidate for Annapolis, you have a lot to think about and a lot of questions to ask. I don't have all the answers. No one does. I can, of course, assure you that we have a beautiful campus, that our faculty and facilities are first-rate, and that the choice of 27 majors we offer should include at least one in which you have a particular interest.

I can also assure you that we will work hard at Annapolis to challenge you and to bring out the best in you—morally, mentally, physically—for the full four years. Make no mistake. We are here to help you make yourself into the best naval officer possible. We take this responsibility seriously. Life here isn't easy, and we don't pretend the Naval Academy is for every young man.

For many, the Naval Academy turns out to be the best step they ever took . . . the start of a challenging way of life, the reward of service to their country, something to look back on with great pride and satisfaction, to cherish during many a quiet moment at sea.

It is not all work here. Far from it. There are sports, dances, sailing, clubs, bands, dramatics, student publications, student government, Big Brothers, choirs, hobbies, cruises to Europe and the Far East—the full range, and then some, of the typical activities you would find on a civilian campus.

Please study this catalog carefully. We have tried to tell it like it is. The first chapter, in particular, should add to your perspective. If you have questions, let us have them. We want you to know as much as possible about the Naval Academy before making up your mind.

It is your decision.



WILLIAM P. MACK
Vice Admiral, U. S. Navy
Superintendent



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I● Why the Naval Academy?

If you have picked up this catalog and thumbed through it this far, presumably you have at least some interest in the Naval Academy. Perhaps it is only a fleeting one prompted by curiosity. Or, conceivably, your interest could be a deeper one and you could be thinking of attempting to obtain an appointment to the Academy. In any case, it is reasonable that you should want to ask questions about it. What can Annapolis offer me that other schools cannot? What will I get out of it in the long run? In short, why should I consider the Naval Academy in making my plans for the years ahead? The paragraphs below are an attempt to provide brief, objective answers to those questions.

Service to Country

We should be frank about this from the beginning. The purpose of the Naval Academy is to prepare young men to be professional officers in the Navy or Marine Corps. No one asks that you come to Annapolis with your mind made up that you want to be a career officer in the naval service. We do, however, ask that you come with the realization that you are being educated and trained for service to your nation. You should be ready and willing to complete the four year curriculum, to serve in a ship, aircraft squadron, or the Marine Corps for five years after graduation, and you should have an open mind as to your future after that five years. Dedication to this idea of service to your country must be high in your reasons for coming to Annapolis if you hope to succeed, and if you are to justify taking a place in the entering class.

Education

A sound college education is the foundation for every profession in our society. The naval profession is no exception. Since its founding in 1845, the Naval Academy has been dedicated to providing the best education for its students consonant with its mission and the needs of the Navy. In recent years, the growing complexity of the Navy, both in its internal technology,



and in the nature of its outside relationships, has changed the requirements for the undergraduate education of its officers at Annapolis. The bedrock of today's Naval Academy education is still in the professional, seagoing, ship-board subjects required of each graduate. Beyond these, however, each midshipman may now choose to study any one of 26 majors, ranging from engineering through oceanography and mathematics on to history, economics, and international affairs. The needs of the Navy require that at least 70 percent of the midshipmen in each class be enrolled in engineering, scientific, or mathematics majors. Other midshipmen major in the humanities or social sciences. Whatever your major, you will find yourself well prepared at graduation for your duties as a junior officer.

Leadership Training

The Naval Academy does much more than simply offer you a sound college education. Its program includes military training, physical training, and the inculcation of the ideals of the naval profession. The purpose of the overall program at Annapolis is to produce a self-confident leader who accepts his responsibilities both to the nation he serves and to the men he commands. This is not an easy goal and no one should come to the Naval Academy with the idea that the training program is a sort of spare-time adjunct to the educational program. It is all-encompassing and its activities pervade the four-year course through all the months of the year.

The plebe year at Annapolis is not easy. It is a year of development in a new and different environment. You will certainly feel pressure and stress in the process and you will learn to utilize time better than you ever have before.

Beyond plebe year the Academy applies its regulations and its system of accountability to you with decreasing severity until, during your first class, or senior, year, you will have a great deal of freedom in choosing what you will do and where you will go. Along with that increased freedom, however, will come increased responsibility. The first class, and particularly the Brigade officers chosen from the first class, are charged with much of the responsibility for running the Brigade. Student government was a reality at the Naval Academy long before it was being discussed at other institutions.

Your four years at Annapolis will not be easy ones. No achievement so worthwhile is ever easy. By the time you graduate, you will have developed your potentials of scholastic achievement, physical conditioning, and leadership ability to the best possible advantage.

Travel and the Sea

The Naval Academy is linked with the sea through its history, its mission, its day-to-day work, and its future. As you stroll through the Academy Yard, you can see ocean-going ships plying the Chesapeake on their way to and from Baltimore. Whatever the month, you will usually see part of the Academy's fleet of nearly 100 small-craft—sail and power—underway in the Severn River or on the Bay.

Perhaps you have never thought much about the sea; perhaps you have lived near and known it well all your life; perhaps you have never known much about it but it has always spelled adventure, travel, and excitement for you. Whatever your situation, you should not think seriously about Annapolis without also thinking about the sea.

Two of your four summers at the Academy will be devoted to cruises in ships of the Navy. After your plebe year, your youngster cruise will take you to distant ports in Europe or the Far East. Recent Academy cruises have gone to Kiel, Portsmouth, Rotterdam, and Copenhagen in Europe, while the Pacific groups have visited Hawaii, Australia, Japan, and Hong Kong.

On these cruises you will stand the crew's watches on your ships, applying much of what you have learned in your professional courses during plebe year. Similarly, when you go on your first class cruise the summer before your last year at the Academy, you will have an opportunity to stand the watches of a junior officer, applying again a portion of your professional training and education. And, once again, you will visit ports in Europe or the Far East.

These ties between practical work at sea and academic work at Annapolis are symbolic of the balance between training and education that is at the heart of the Annapolis program.

Professionalism

This is the word used at Annapolis today to express the overall excellence that has been our ideal since the founding of the Academy more than a century and a quarter ago. It expresses many things—but at the heart of it is the desire for service to country with which this chapter started. The midshipmen themselves have a good phrase they use when asked if a particular person should come to the Academy. They say, "You have to want it." That really says it all.

It's up to you.





II.

● The Years 1845–1974

Through the years 1845 to 1974, as the nation's responsibilities and need for seapower have grown, the Navy has increased greatly in size and complexity. Keeping pace, in peace and war, from sail to steam, and into the nuclear age, the Naval Academy has responded to every challenge, expanding its facilities and revising its curriculum as necessary to provide the timely, second-to-none professional leadership expected in the United States Navy.

The Naval Academy was founded as the Naval School in 1845 by the Honorable George Bancroft, distinguished historian and educator, and Secretary of the Navy in President James K. Polk's Cabinet. It was located in Annapolis, Maryland, on the 10-acre site of the Army's nearly abandoned Fort Severn, where the Severn River empties into the Chesapeake Bay.

Commander Franklin Buchanan was the first Superintendent of the Naval School. His seven-member faculty of four officers and three civilians taught gunnery, naval tactics, engineering, chemistry, mathematics, astronomy, French, and English. The course of study was five years: the first at Annapolis, three at sea, and back to the School for the fifth. Sixty midshipmen, comprising two classes, attended the Academy's first convocation.

In 1850–51, the Naval School was reorganized as the U. S. Naval Academy, the Board of Visitors first met at the Academy, and the course of study was reduced to four academic years. Summer training cruises provided the midshipmen with seagoing experience to augment their classroom work. Thus, the forerunner of today's basic four-year curriculum and summer cruise program first appeared at the Naval Academy well over 100 years ago.

During the Civil War, the Brigade of Midshipmen was moved temporarily to the more secure surroundings of Newport, Rhode Island. Following the war, the Brigade returned to Annapolis to stay. During these early years, the Academy was one of the few institutions in America offering a sophisticated, technical undergraduate program.

In the late 1870s, Albert A. Michelson, a graduate of the Class of 1873, performed his world-famous measurement of the velocity of light while serving as an instructor in the Department of Physics and Chemistry at the



Academy. Michelson continued his brilliant scientific work after leaving the Navy, and, in 1907, he became the first American scientist to receive a Nobel Prize. The supreme compliment was paid by Albert Einstein who once noted that the inspiration for his theory of relativity came directly from Michelson's work. Thus, it is not surprising that the science wing of the Academy's recently-completed science and mathematics building complex is named Michelson Hall.

Other distinguished graduates include Alfred Thayer Mahan, whose profound writings on seapower and its influence on history are still the world standard in the field, and a succession of renowned military leaders in peace and war for over 100 years. Admirals Dewey, Sims, King, Nimitz, Halsey, Spruance, and Burke need little introduction. The successors and heirs to their greatness are midshipmen today.

Following accreditation of the Naval Academy in 1930 by the Association of American Universities, a Congressional law was passed in 1932 authorizing



the Academy to confer the Bachelor of Science degree upon all graduates, beginning with the Class of 1931. In 1939, Congress authorized the awarding of the B.S. degree to all living graduates. The Middle States Association of Colleges and Secondary Schools first accredited the Academy in 1947. And, in 1958, the tests of the College Entrance Examination Board replaced Academy-prepared entrance examinations.

In 1966, an Academic Advisory Board of distinguished Americans was appointed by the Secretary of the Navy to advise and counsel the Superintendent on academic matters.

Yard and Facilities

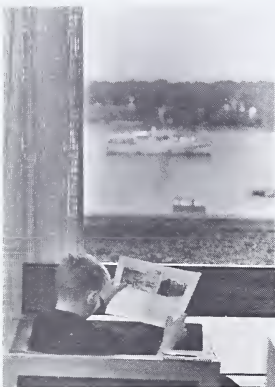
Long recognized as one of the most beautiful of our historic landmarks along the eastern seaboard, the Naval Academy was designated a U. S. National Historic Site in 1963. Each year over one million visitors tour the











grounds and buildings of the Academy. Everyone is welcome during daylight hours, and a visitors' service providing guided tours, maps, and information is available. Annapolis is less than an hour's drive from Washington, D.C., or Baltimore, Maryland.

Physical and academic facilities have kept pace with the demands of the curriculum and the Fleet. The original ten acres have grown to today's 302 acres. Much of this acreage increase has resulted from a series of landfills in the Severn River. A recent landfill, completed in 1959, added 56 acres for athletic fields and new buildings. Construction of a number of buildings in use today began in 1899 with a Congressional appropriation of ten million dollars. Ernest Flagg was the architect; the style is French Renaissance.

Recent years have seen the addition of new wings to Bancroft Hall, the midshipmen's dormitory; the construction of a Brigade assembly hall; the construction of an athletic field house large enough to accommodate the entire 4,200-man Brigade of Midshipmen and the families and friends of first classmen at graduation time; and the construction, with privately donated funds, of the nearby Navy-Marine Corps Memorial Stadium. A multimillion-dollar renovation of Bancroft Hall was completed in 1965.

Sharing the spotlight with other impressive buildings in the Yard is the chapel, with its towering dome, beneath which lies the crypt of John Paul Jones. Throughout the Yard stand other monuments and mementoes commemorating the deeds of our great naval heroes and celebrating the Navy's finest traditions.

Currently, a seventy-three-million-dollar construction and rehabilitation plan is nearing completion. Key structures in this plan are the new science building, Michelson Hall, and the adjoining mathematics building, Chauvenet Hall. Both were completed in 1968. The 650,000-volume capacity Nimitz Library, overlooking the Severn, was completed in 1973. An adjacent engineering building and laboratory complex is scheduled for completion in 1975. A full range of facilities and services for student and faculty research, computer-aided education, and educational television is being provided throughout the academic complex. All academic areas will be air-conditioned.

During the past year, privately donated funds from friends and alumni have made it possible to build the Robert Crown Center, new waterfront headquarters for our sailing program, and an activity center (student union) which includes an indoor ice skating rink, a cafeteria, lounges, and game rooms.

The center for daily living is Bancroft Hall, perhaps the largest dormitory



complex in the world. Stretching over many acres, it houses the entire Brigade. All of the necessary basic facilities, as well as many for recreation, are found in Bancroft Hall. Press shops provide rapid service on midshipmen uniforms which the tailor shops keep fitted and repaired. There is a Steerage, or soda fountain. The midshipmen's store is the place to buy daily necessities and an occasional gift. There are small Protestant and Catholic chapels, with chaplains' offices adjoining.

The entire Brigade dines together in the spacious and modern Midshipmen's Wardroom. Here, midshipmen demonstrate their enthusiasm for the appetizing, freshly prepared meals by taking a 4,500-calorie daily diet in stride.

Laundry and dry cleaning services are provided. There is a cobbler shop, a post office, a library, an assembly hall, a bookstore, and the midshipmen's radio station. For recreation, there are bowling alleys, squash courts, club-rooms, a photo laboratory, and a band room. On weekends, Memorial Hall, Smoke Hall, and the activity center in Dahlgren Hall provide attractive settings for dances and other recreational activities.



III. Life at Annapolis

Mission

The Naval Academy is charged with the responsibility of preparing midshipmen for service as commissioned officers in the U. S. Navy or Marine Corps. In fulfillment of this responsibility, the staff and faculty must ensure not only that the academic program is of the highest quality but also that midshipmen are imbued with the finest sense of duty, honor, and loyalty, and that they are physically prepared for the rigors of commissioned service. This is a threefold mission that requires careful organization and a clear set of priorities.

During the academic year, first priority is given to studies and each midshipman has ample time for out-of-classroom study and research. On weekdays, following the last class of the day, midshipmen participate in intramural or varsity sports and other extracurricular activities.

During the summer months, the emphasis swings to professional training, and upperclassmen engage in a program of summer cruises at sea or in indoctrination visits and training at selected naval shore activities. Upon completion of the summer training program, upperclassmen enjoy an extended leave period.

Organization

To accomplish the uniquely military aspects of the Naval Academy's mission, the student body is organized into the Brigade of Midshipmen. The Commandant of Midshipmen, a rear admiral or a senior Navy captain, commands



the Brigade. He is responsible for instilling high ideals of duty, honor, and loyalty; for providing military indoctrination and physical development; and for inculcating midshipmen with the desire to achieve the high standards of performance required of midshipmen and officers of the naval service. In carrying out these responsibilities the Commandant is assisted by an immediate staff of officers, designated the Office of the Commandant, and by five subordinate departments or groups of officers. The departments reporting to the Commandant include the Physical Education Department, the Dental Department, the Midshipman Supply Department, the Brigade Chaplains, and the Brigade Officers.

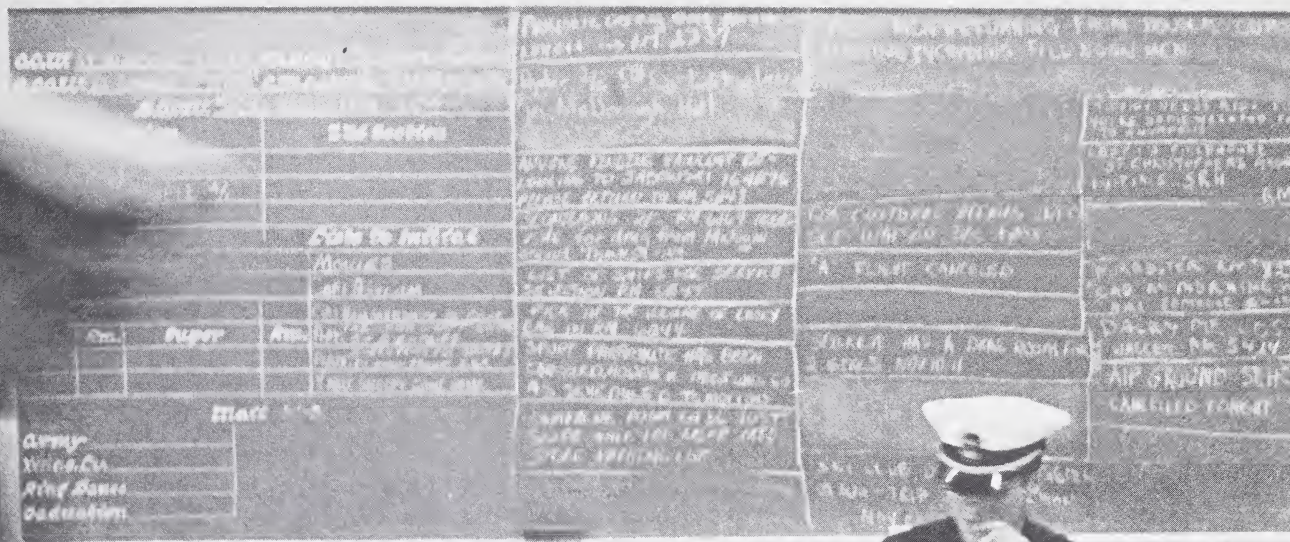
The Brigade Officers consist of six Battalion Officers, officers of the grade of Navy commander or Marine Corps lieutenant colonel; and 36 Company Officers composed of Navy lieutenants and lieutenant commanders and Marine Corps captains and majors. These officers work and live in close daily contact with the midshipmen in Bancroft Hall. Here, by precept and example, the application of sound techniques of leadership, counsel, and guidance, and, when required, corrective or disciplinary action, each midshipman is measured, molded, and motivated for the day when he will join the Navy or the Marine Corps as a commissioned officer.

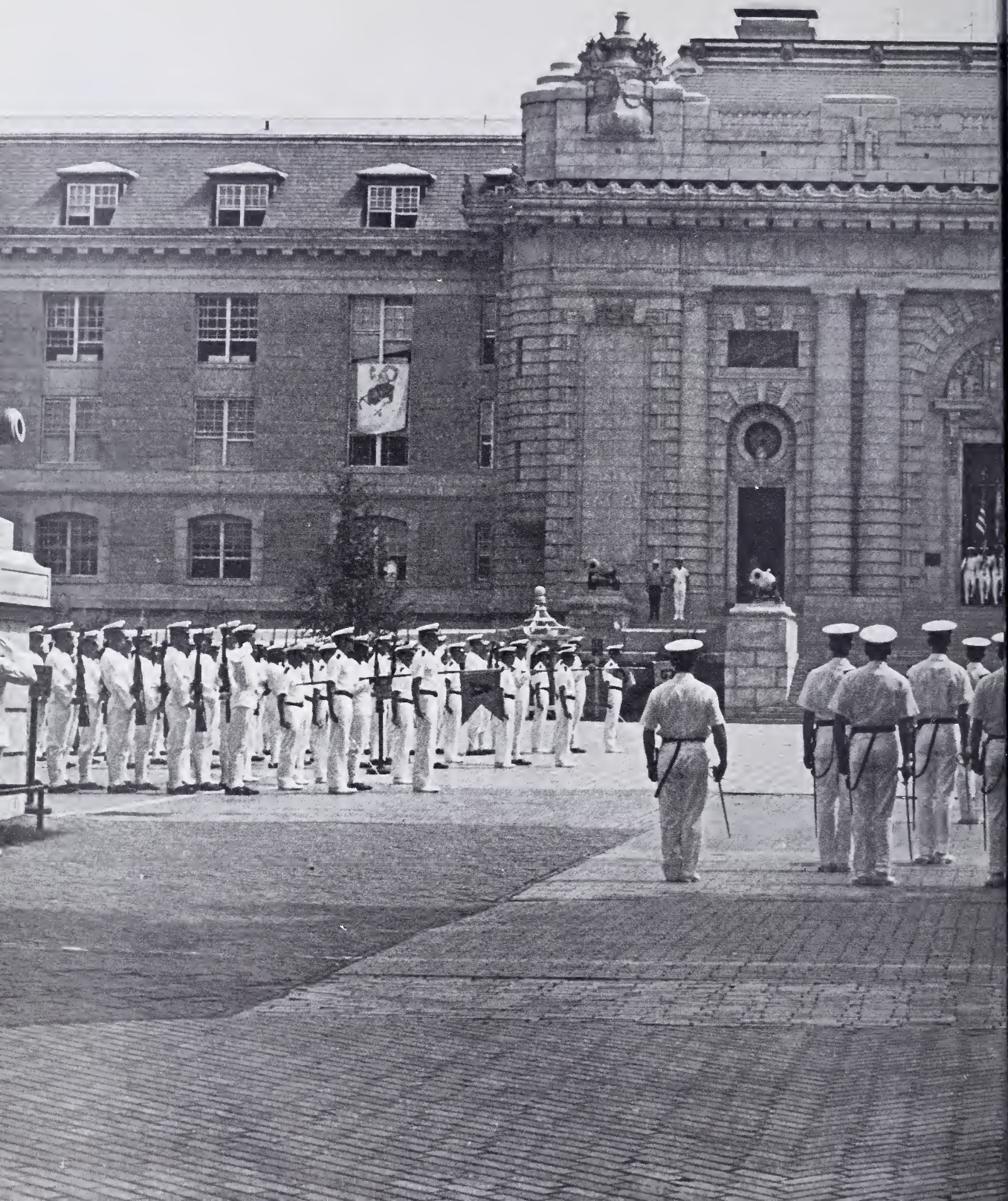
For purposes of military training and administration, the 4,200-man Brigade of Midshipmen is divided into two regiments, each of which is divided into three battalions. The six battalions are each divided into six companies. Midshipmen of all four classes are assigned to each company—the basic military and organizational unit for numerous competitive activities during the year.

Each of these military units, from the Brigade down to the 36 companies and their subordinate platoons, is under the command of a first classman, aided by his midshipmen staff and assistants. Midshipmen are selected by the Brigade Officers for these commands and staffs on the basis of their demonstrated proficiency in leadership and their other officer-like qualities.

Years of Development

The incoming midshipmen are officially designated midshipmen fourth class, but are traditionally known as plebes. In succeeding years, they become third classmen or youngsters, then second classmen, and finally, in their senior year, midshipmen first class.









Plebe Year. The new midshipman undergoes a comprehensive program of military training and indoctrination from his first day in early July until the end of his plebe year the following June. Demands upon him and upon his spare time, all with good reason, seem never-ending. Each midshipman quickly learns during this period that he is a learning subordinate, under close supervision and careful guidance. Plebe indoctrination is administered by midshipmen of the first class, assisted by the second classmen, and closely supervised by the Commandant and the Brigade Officers.

Although some form of military training is found at many American colleges and universities, the rigorous routines and challenges of a plebe indoctrination system are unique to the Service Academies. Complementing other phases of midshipmen training and education, the system directly supports the Naval Academy's mission by developing leadership abilities and a basic understanding of military relationships and the military environment. Its aim is to teach each plebe to:

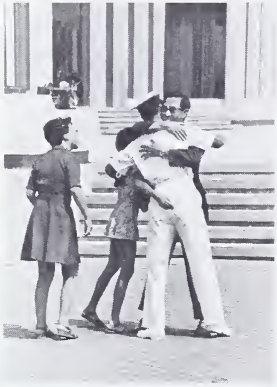
**Exercise self-discipline,
Organize his time and effort effectively,
Perform efficiently under stress,
Think and react quickly with good judgment,
Exhibit an exemplary military bearing and appearance.**

Plebe year is designed to test and develop. It is a deliberate period of testing, requiring a midshipman to stand on his own feet, to produce under pressure, to respond promptly and intelligently to orders and, finally, to measure up to the highest standards of character, honor, and morality.

The first day of plebe summer is a day that most midshipmen will remember for many years. This is scarcely surprising, for in one short day, civilians become midshipmen. They are given haircuts, issued uniforms, taught the basics of marching, and served their first meal in the vast Midshipmen's Wardroom. Their military indoctrination gets off to a fast start, but they are too busy to have time to worry about it. Civilian ways and days soon seem far behind.

As the summer progresses, the new midshipmen rapidly assimilate basic skills in seamanship, navigation, and signaling. Infantry drill, firing an M-16 rifle and .45 calibre pistol under the supervision of U. S. Marines, sailing Navy yawls, and participating in a rigorous physical conditioning program make each midshipman a proudly versatile young man. Team spirit and the





desire to win are developed through competition in a wide range of activities, including athletics, dress parades, seamanship, and talent shows.

Plebe summer terminates in late August with Parents' Weekend, when parents of the new midshipmen have the opportunity to visit the Academy and enjoy the weekend with their sons. A dress parade, exhibitions in sports, dining and sailing with their sons, and the opportunity to meet the faculty and company officers help to assure parents that their sons are taking their new life as midshipmen in stride.

September arrives. Upperclassmen return from at-sea training, leave, and other summer activities. Plebe summer is over, but plebe indoctrination continues. The academic year gets underway. Four years of studies have begun, paced by a demanding daily schedule . . .

6:15—Reveille

6:45—7:10—Breakfast (optional for midshipmen first and second class)

7:15—7:30—Special instruction period for midshipmen fourth class

7:35—Quarters for muster and inspection

7:55—8:45—First period

8:55—9:45—Second period

9:55—10:45—Third period

10:55—11:45—Fourth period

12:05—Call to noon formation

12:20—Noon meal

1:15—2:05—Fifth period

2:15—3:05—Sixth period. (With the exception of a few midshipmen having a seventh period laboratory, midshipmen utilize the time from the end of the sixth period until evening meal formation to participate in varsity and intramural sports and other extracurricular and personal activities.)

6:30—Evening meal formation

7:45—10:30—Study period

10:30—Taps

September also brings the excitement of football and other fall sports. During the football season, selected units of the Brigade travel to out-of-town games. The entire Brigade attends home games, and, at the end of the season, travels to Philadelphia for the annual donnybrook with the Black Knights of the Hudson, the cadets of West Point.

Christmas brings 15–20 days of leave, which provides plebes with the first opportunity to visit their homes since their arrival at the Naval Academy in July, and gives all midshipmen a welcome break in the academic routine.





Classes resume in early January, followed by examinations near the end of the month. Exams are followed by a three-day leave period and the start of the second semester. Five days of leave break the academic routine over the Easter weekend.

The approaching end of plebe year brings mixed emotions. A feeling of relief that it is almost over—yes; yet, at the same time, there are well-deserved feelings of confidence and pride that the challenge has been met.

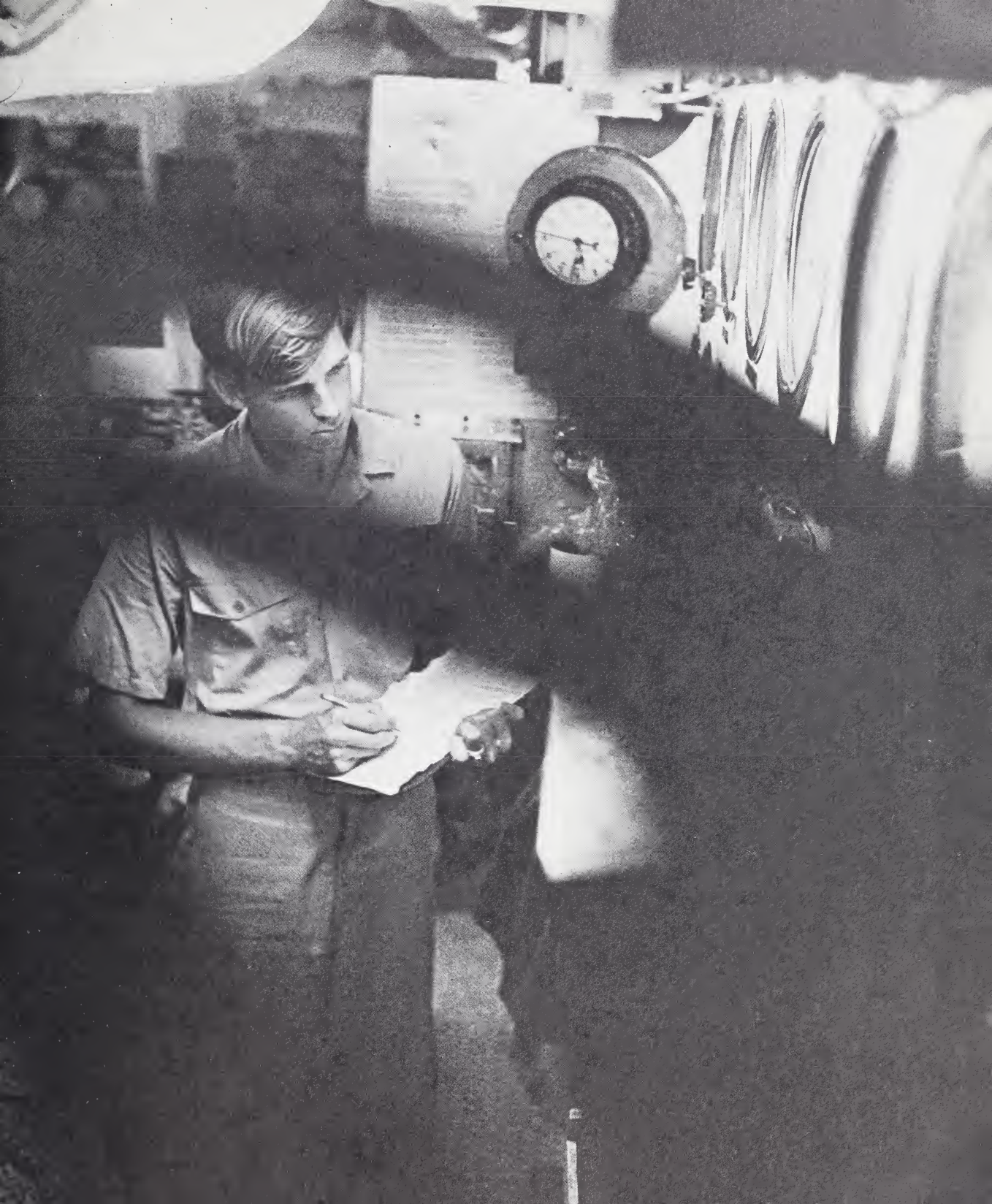
Third Class Year. At the end of June Week, the first year of intensive indoctrination is ended, and the new third classmen depart on two months of training at sea with the Fleet, accompanied by midshipmen of the first class. At-sea training is followed by 30 days of leave.

During his first taste of life at sea in the Navy, the midshipman comes to know and respect the Navy's enlisted men whom he will later command and upon whom he will depend as an officer. He serves in many capacities and actively participates in a wide range of shipboard operations. He stands deck, gunnery, operations, and engineering watches; he operates ship's boats, and exercises at general shipboard drills.

With the completion of at-sea training and summer leave, third classmen return to the Academy to begin their second academic year. And, although the new year brings more responsibilities in infantry drills and in watch-standing, the lessened emphasis on indoctrination leaves more time for sports and other extracurricular activities. It is a welcome and deserved change!

Following the completion of academic study during third class year and the end of their second June Week, the third classmen become second classmen.

Second Class Year. During a fast-moving summer, second classmen undertake professional studies at the Naval Academy and receive familiarization training in the four warfare specialties which comprise the naval service. In New London, Conn., each receives an introduction to the submarine service through lectures ashore and through visits and short cruises on board nuclear submarines of the U. S. Atlantic Fleet. Traveling to Newport, Rhode Island, the new second classman attends a familiarization course at the U. S. Naval Destroyer School and visits modern destroyers. Flight indoctrination in naval training and operational aircraft at Pensacola, Florida, provides a knowledge of the duties of an officer choosing a career in naval aviation. Introduction to the techniques of vertical envelopment and amphibious assault, provided by the Marine Corps at one of their major training facilities, completes the summer's professional training.





Following summer leave, as the second class midshipmen return to the Academy to begin their third academic year, still greater military responsibilities become theirs. Midshipmen officers are selected and trained to direct the Brigade during periodic absences of the first class. An important role in the indoctrination of the new fourth class is undertaken by the second class. In addition to contributing to the development of the fourth classmen, this responsibility makes a vital contribution to the second classmen's growth as leaders. There is little time for watching the calendar. And, before long, another June Week has come and gone, and first class year is underway.

First Class Year. During their last summer, first classmen go to sea for training with the Fleet for their second and last time as midshipmen. Here, they have the opportunity to assume the responsibilities and perform the duties of junior officers, and they assist in the training of the third classmen assigned to their ships. A number of carefully chosen members of the first class will also take part in the training and indoctrination of the new plebe class at Annapolis during the summer.

On board the cruise ships, functioning as a junior officer, the first classman is exposed to the social courtesies, amenities, and customs of wardroom life. Work in navigation, watch-standing on the bridge, exercises in the combat information center and in the engineering spaces, and lectures and studies on other aspects of ship-board life complete the summer's training with the Fleet.

Normally, midshipmen visit a number of foreign lands and ports during their training cruises with the Fleet. Visits are made to such places as Hawaii, Japan, Hong Kong, Australia, and New Zealand in the Pacific; Gibraltar, Barcelona, Cannes, Naples, and Athens in the Mediterranean; and Rotterdam, Kiel, Copenhagen, and Oslo in Northern Europe.

The important responsibility assigned the first class in directing the Brigade of Midshipmen has been previously noted. Midshipmen officers, called stripers, lead the Brigade in parades, ceremonies, and at daily formations. They are responsible for the conduct, military smartness, and competitive records of their units. They are in charge of the midshipman watch organization in Bancroft Hall. The selection of four sets of midshipmen officers during each academic year increases the individual opportunity for this valuable leadership experience. The fourth, or June Week, set of stripers is selected by the Commandant from among the most capable midshipmen in the first three.

In carrying out these demanding responsibilities, the first class midshipman finds himself calling upon all the leadership skills he has developed during his first three years. Thus, following this final year of practical experi-

ence, graduation finds him well prepared to assume his leadership responsibilities in the Navy or the Marine Corps as a newly commissioned officer.

The Professional Training Program

The Commandant directs the Academy's professional training program. The program encompasses a wide range of professional training and drills, and is designed to provide graduates with a sound foundation in the fundamental specialized subjects and skills required of professional officers in the Navy or Marine Corps.

Over 2,000 hours are devoted to building this foundation during the midshipman's four years at the Academy. A midshipman's class standing at graduation depends significantly on his professional training performance.

Included in the program are lectures, practical training, physical education, and a variety of evolutions and drills in which the midshipmen learn by doing. Progressing from basic military and naval knowledge to the presentation of more advanced information and concepts, the program supports and complements both the military life within the Brigade and the professionally-oriented academic courses. A description of the courses, drills, and training making up the professional training program begins on page 133.

Leave and Privileges

The amount of personal freedom and the privileges granted a midshipman vary directly with his seniority, his responsibility, and his performance. A first classman not only will have more responsibility in the administration of the Brigade, but he will also have more privileges. Proficiency in academic work and in military aptitude is also rewarded with extra privileges.

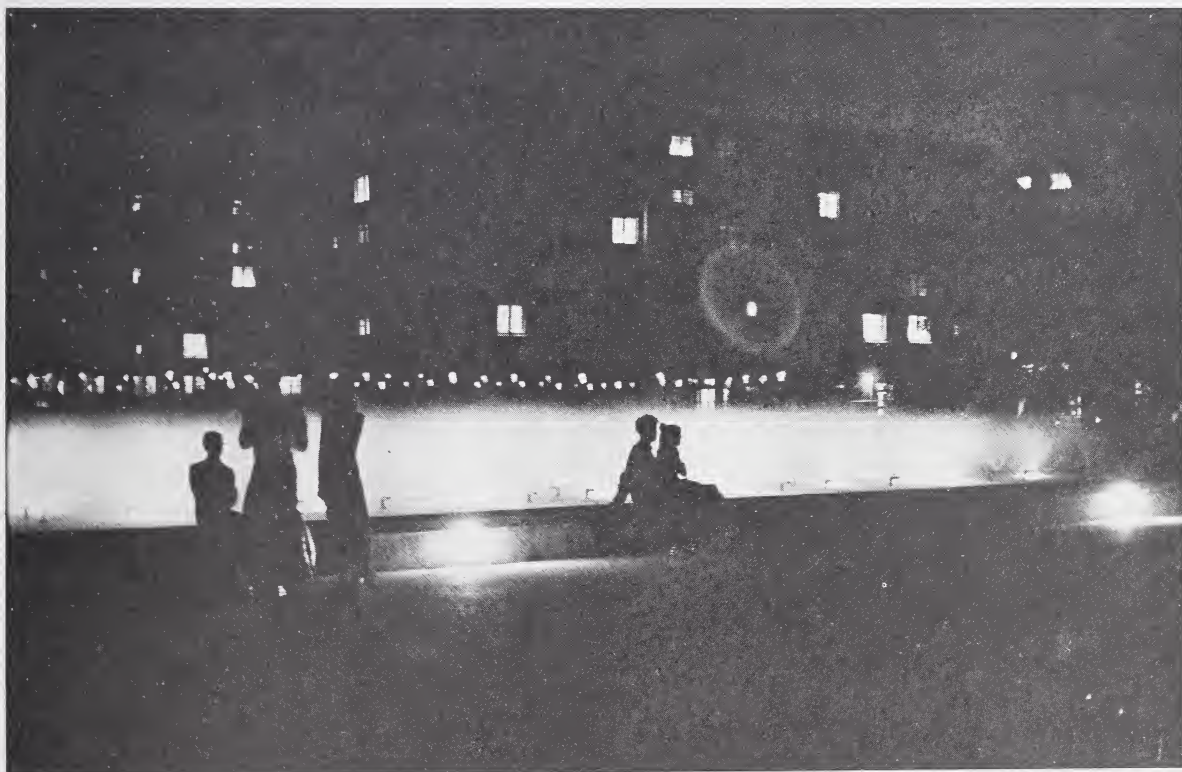
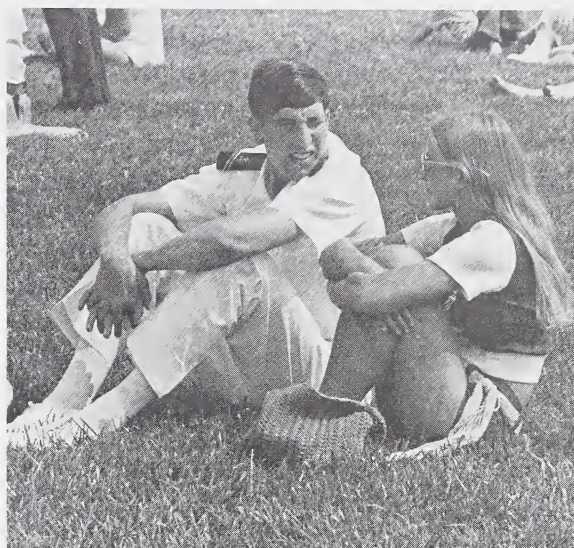
There are several regular periods of leave of absence from the Academy during the year. These include Christmas leave, a period of 15–20 days; end-of-semester leave, a three-day break at the end of the first semester in January; spring leave, a period of about five days, including Easter Weekend; and the month-long summer leave for the three upper classes.

In addition to leave, midshipmen are granted liberty in the Annapolis area. Like all other privileges, the amount varies with seniority and responsibility. Fourth classmen are granted liberty on Saturday afternoons and dining-out privileges with relatives and close friends on Saturdays and Sundays. They are permitted to have dates on at least four weekends in addition to June Week.

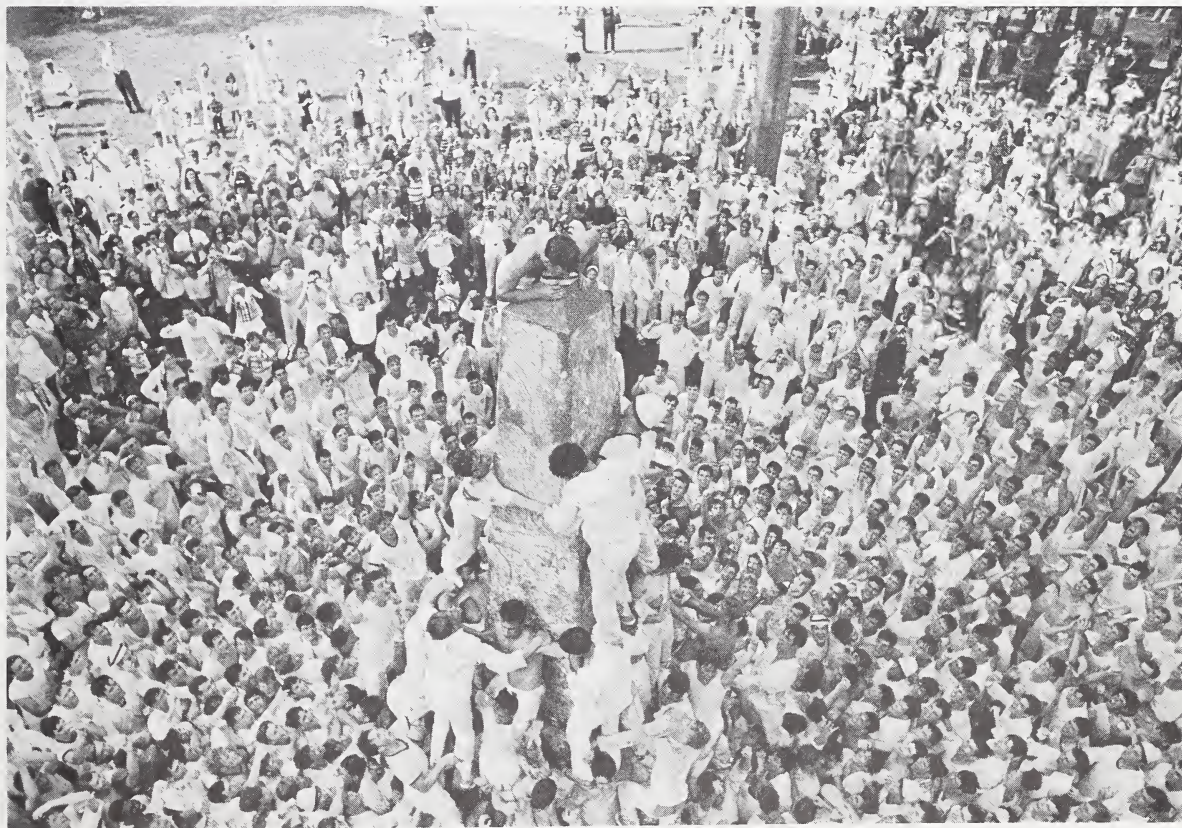
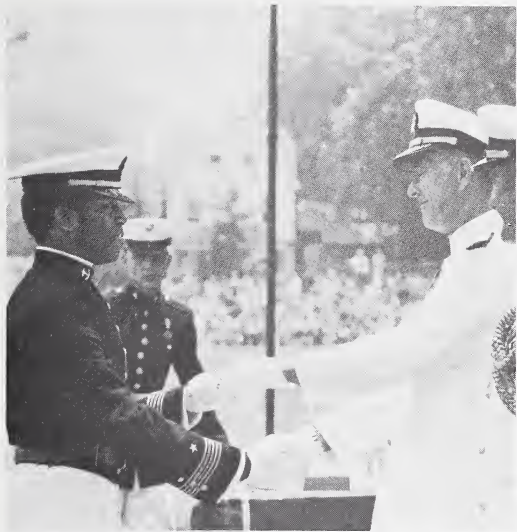
First, second, and third classmen have liberty on Saturday afternoons and evenings, and on Sunday afternoons. In addition, second classmen rate liberty













on Wednesday afternoons and first classmen rate liberty weekday afternoons and on Friday evenings. Weekday liberties begin after classes are completed for the day.

Weekend liberty is granted to upperclassmen. Midshipmen third class may take two weekends each semester; second class midshipmen receive three each semester. First classmen are not limited in the number of weekends they are authorized to take; however, a certain percentage are required to remain at the Naval Academy during the weekend period in order to carry out the administrative functions of the Brigade. Additional weekends may be granted to midshipmen of the second and third classes for noteworthy academic performance or other individual achievements.

Cultural Affairs Program

To enrich life at the Academy and stimulate a lively interest in the performing arts within the Brigade, the Cultural Affairs Program, sponsored by the English Department, offers many opportunities for midshipmen to attend the finest professional productions of dramas, operas, symphonies, and ballets in nearby Washington and Baltimore. Field trips throughout the academic year are made to the Kennedy Center and other outstanding theatres by interested midshipmen and their guests.

Physical Education

In supporting the mission of the Naval Academy, the program of the Physical Education Department makes a vital contribution to the physical development of midshipmen. The program continues throughout the four years. All midshipmen participate.

The program's aims are to develop skill, confidence, teamwork, endurance, agility, and competitive spirit; to develop useful habits of physical fitness; to develop the capability to train and instruct others; and to develop the background and capability to withstand physical hardship. Equally important, the program aims to be enjoyable, to provide a release from the academic routine, to develop a lasting appreciation for sports in general, and to develop individual skills in carry-over sports for enjoyment after graduation.

The program gets off to a fast start during plebe summer. Preliminary testing of posture, swimming capability, and general athletic ability is followed by instruction and practice in boxing, wrestling, lacrosse, fencing, soccer, rugby, gymnastics, crew, golf, tennis, squash racquets, swimming and track.

The pace continues during the first academic year. Instruction is given in swimming, boxing, wrestling, gymnastics, golf, personal conditioning, squash racquets, soccer, tennis, and volleyball. In addition, midshipmen develop their skills in basketball, handball, and bowling, and they are tested in applied strength, agility, swimming, boxing, wrestling, gymnastics, and during a mile run and on the obstacle course.

The final three years provide increasingly advanced instruction and demanding tests. For additional details of the Physical Education Department and its program, refer to chapter 8.

Medical and Dental Care

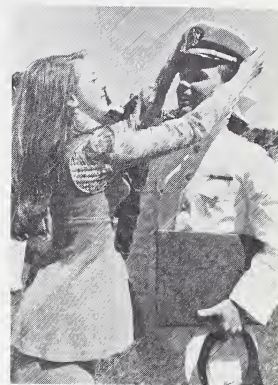
The finest medical and dental care is provided each midshipman. Facilities in Bancroft Hall are modern and extensive. Daily sick calls, when necessary, and periodic physical and dental examinations help keep midshipmen in excellent health. If hospitalization is necessary, there are the more complete facilities of the Naval Hospital at the Academy as well as those of the nearby Naval Hospital at the world-famous National Naval Medical Center in Bethesda, Maryland.

Legal Assistance

Midshipmen are provided professional legal advice and assistance for problems of a personal nature by the Legal Assistance Officer in his professional capacity as a lawyer in uniform. His office is located in the Administration Building.

Financial Advice

Midshipmen are provided financial advice on matters relating to loans, insurance programs, and estate planning throughout their four years at the Academy. This is accomplished through battalion and company-size lectures and through individual counselling as needed. The Midshipmen Financial Advisor is a Navy Supply Corps officer, and his office is in Bancroft Hall.





Religious Activities

The copper-green dome of the chapel towers over the other buildings at the Naval Academy and, in a sense, acts as a symbol of Annapolis to the outside world. This is more than a coincidence. Over the decades of American history, fighting men have learned by experience that there is a dimension to military leadership—both in and out of combat—which is essential to real effectiveness. This is the spiritual factor, the intangible thing we call moral courage.

What is it that strengthens men in the daily battles of life? Where do they turn for help and reassurance in times of special stress? What makes them capable of decisions that disregard political or personal expediency? The answers to these questions vary widely among individuals who serve in the armed forces—there are perhaps as many answers as there are individual fighting men.

An awareness of the diverse concerns and needs of their men both in the daily routine of life and in times of stress and danger is an essential dimension of the responsibility of being an officer. It is a major reason why the Naval Academy has long had a program designed to produce an appreciation in its graduates of the spiritual and moral dimensions of military leadership.

Attendance at religious services is optional. Midshipmen are encouraged to worship according to the dictates of their own consciences. They are reminded that, as officers in the naval service, their personal beliefs will often be tested, and that, in times of stress, their men will look to them for spiritual as well as professional guidance. The Naval Academy believes that future officers owe it to themselves and to their men to gain insights into the moral, ethical, and religious dimensions of leadership and, therefore, urges midshipmen to take full advantage of opportunities for worship and moral development.

Some midshipmen prefer a service in the tradition of their own faith pursued at one of the many local churches in Annapolis. Others select the Academy's Protestant or Catholic chapel services which periodically feature nationally famous guest preachers and lecturers. Whatever the approach chosen by the individual, he is encouraged and provided many opportunities to seek the strength and inspiration that comes from friendship with God.



IV

● The Naval Profession

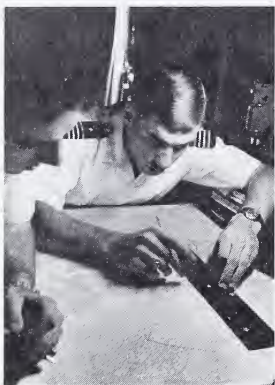
Ours is a complex Navy—one whose ships range every ocean, whose officers and men not only sail the seas but are also engaged in research from the tropics to the poles and into space, whose supersonic planes provided the training ground for America's first astronauts, whose nuclear submarines are a testimony to America's engineering genius, whose leaders advise in the highest councils of government, and whose Marines stand second to none when tales of valor are told. Though ours is a vastly complicated and technological Navy, the human being is, in the end, all-important. It is an organization which puts a high premium on leaders with vision, dedication, and ability. It is a Navy with a proud past and a promising future, broad enough to provide a stimulating challenge in a spectrum of interesting fields.

After four intensive years of learning at Annapolis, the Naval Academy graduate is ready to assume his responsibilities as an officer in the greatest Navy or Marine Corps in the World.

First Duty

An Annapolis graduate's first career opportunity comes in his choice of duty following graduation. The priority assigned his individual preference is dependent upon a number of factors, including his class standing, the needs of the Navy, and his personal qualifications. Every attempt is made to assign him to the duty and locality he requests.

Whatever his initial operational duty, he will usually find that his responsibilities are greater than those of his contemporaries in civilian life. Most Naval Academy graduates are commissioned as ensigns in the line and are, thus, headed ultimately for command at sea. As a matter of policy the great majority of graduates initially go to sea in a combatant-type surface ship—i.e., aircraft carrier, cruiser, destroyer, or amphibious warfare ship. A certain percentage of the graduates may volunteer and be selected for warfare specialties or programs, such as aviation, nuclear power (either submarine or surface), and special warfare.



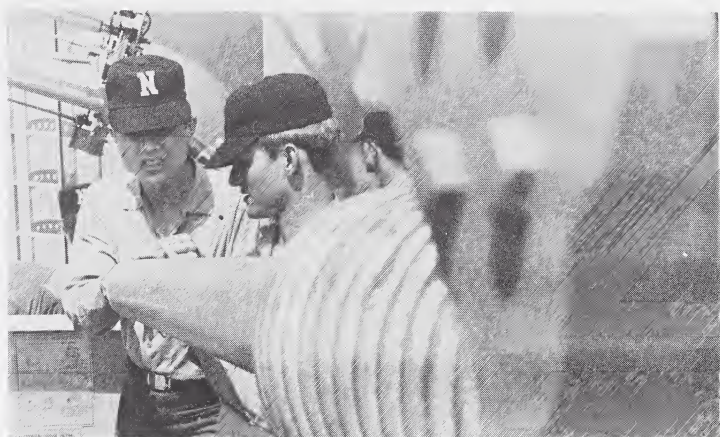
Prospective aviators go to sea with the Fleet for 6 to 15 months before entering flight training. Most of those selected for the nuclear power program go directly to nuclear power school following graduation; the others follow within a few months. Graduate programs leading to advanced degrees are available to a small number of new graduates. Normally these special programs will follow a short tour of sea duty.

A maximum of 16 percent of Annapolis graduates may volunteer for appointment in the Marine Corps as second lieutenants. All must complete basic training before joining regular Marine units or commencing flight training.

A small number are commissioned on graduation in the Civil Engineer Corps, or as engineering duty officers. The civil engineer designees, after a short tour in a public works or Seabee command, proceed to graduate studies at a civilian university. Supply Corps officers attend a special Navy school of several months' duration prior to their first operating assignments. The engineering duty officers (specialists in such fields as ship and aircraft design, construction and maintenance, ordnance, electronics, etc.) will normally serve on board ship before returning to graduate study. Those who have completed the bioscience major at the Academy (up to two percent of the class) commence four years of studies at medical school after which they begin careers as Navy medical officers.

Officer Career Patterns

Within the framework of the needs of the service, an officer determines his own career pattern to a significant degree through his requests for assignments afloat and ashore, his advanced studies, and, of course, by his performance. After his initial tour at sea, the young officer has a fairly well developed idea of what career pattern he would like to follow. Line officers seek sea duty assignments that will prepare them for command of a surface ship, submarine, or aircraft squadron. Tours at sea are alternated with shore duty. Graduate studies provide line officers with sub-specialties which are generally exercised during assignments ashore. These sub-specialties include such varied fields as naval intelligence, oceanography, communications, meteorology, nuclear engineering, aeronautical engineering, management, international relations, and personnel administration. Officers aspiring to command at sea will serve in a variety of ships or aircraft squadrons in different capacities, as well as in staff and planning billets afloat and ashore, in the United States and overseas.









It is at once a satisfying and a demanding life. The officer in the Navy or Marine Corps presents many faces to the world as he advances in seniority: professional sailor, Marine, aviator, engineer, scientist, administrator, educator, diplomat, Fleet commander. His is not just a job, but a way of life—a career dedicated to the service of the United States and its people, carrying with it high professional prestige and opportunities for broad experience, a career which rewards the industrious, the loyal, and the imaginative. It is a career for those with a zeal for strenuous living, patriotism, and dedication to an ideal of real meaning, a meaning which can be translated into a lifetime of adventure and service in the Navy or Marine Corps of the United States.

Officer Education and Training

Upon graduation and commissioning, the new officer may lay his books aside momentarily, but his theoretical and practical education will continue as long as he is in the service. From graduation day forward, he will continue to prepare himself for assignments of greater responsibility and professional attainment by acquiring practical experience ashore and afloat and through advanced academic work. The extent of his attainment is limited only by his ability, initiative, energy, and resourcefulness, commensurate with logical career planning and execution.

The Naval Academy is considered but the first step on the educational ladder, and so the Navy and Marine Corps sponsor a wide variety of graduate programs at both naval and civilian institutions, designed to prepare the officer for higher responsibilities. This move toward graduate education begins before graduation for midshipmen who are selected for scholarships in civilian universities or for Navy-sponsored graduate programs.

Navy functional and basic technical courses provide the initial post-commissioning training for many officers. Mostly of short duration, they are in such fields as communications, weapons, antisubmarine warfare, damage control, electronics, and amphibious warfare.

After the first tour (two to four years) of operational duty with the Fleet, many qualified Naval Academy graduates may expect orders to graduate study for one or more years. Opportunities for graduate work continue throughout an officer's career. Senior war colleges, in particular, are noted for bringing officers up to date on problems of international import and for relating these problems to our global strategy. The officer who aspires to positions of high responsibility must, of necessity, continue to grow intellectually and thus he will be a

student during all of his professional life. Appendix F provides a brief summary of graduate study opportunities offered by the Navy and Marine Corps.

The ever-increasing importance of our Navy in defense of this country and fulfillment of our national policy commitments has opened the way for an unprecedented number of career opportunities for a naval or Marine Corps officer. Fleet and field operational experience continues to be an important constant in the career pattern, but the need for specialists trained in technical fields, governmental affairs, education, training, or managerial skills expands at a rate that can be satisfied only by a commitment of the Navy to the concept of an educated officer. This commitment has been made and reaffirmed at every level of leadership in the Department of the Navy. A career officer becomes a part of this commitment, and he can be assured that his professional talents and intellectual ability will be enhanced by advanced education and assignments that fully challenge his interests and capabilities.





V ● Admissions

Each year, the Naval Academy selects approximately 1,350 young men for admission to the plebe (freshman) class. These young men come from every state in the Union and from backgrounds reflecting every facet of American life. The Naval Academy encourages this diversity and recognizes the value and promise of a Brigade enriched by a membership of men representing every race, creed, color, and background found in this nation. Students from minority groups are strongly encouraged to apply for admission. The number of minority students in recent entering classes has risen sharply. The Class of 1977 included 146 (ten percent of the class) from racial minorities.

Certain general eligibility requirements for candidates do exist. A candidate must be a male, at least 17 years of age, and he must not have passed his 22nd birthday by 1 July in the year of admission. He must be unmarried and have no children and, except for limited quotas of foreign midshipmen specifically authorized by Congress, he must be a citizen of the United States.

Meeting these requirements, an interested young man must then proceed to obtain a nomination, qualify medically and physically, and compete for selection. The Admissions Board examines each candidate's school records, SAT or ACT scores, recommendations from school officials, extracurricular activities, and other evidence of his character, leadership potential, academic aptitude and achievement, and physical fitness. Qualification for admission is based on consideration of all of the above factors.

High School Program

Candidates should pursue studies in high school that will prepare them for a rigorous college program. The quality of the work is important. The great majority of young men accepted for admission to Annapolis come from the top 20 percent of their high school classes, and chances for admission are very limited for those who stand below the top 40 percent. While the Academy does not have rigid requirements concerning the subjects which must be



included in the school record, candidates are strongly urged to include the following subjects in their high school or prep school curriculum:

Mathematics—4 years, including trigonometry, **English**—4 years, **Modern Language**—2 years, **Chemistry**—1 year, **Physics**—1 year.

A small percentage of each plebe class will have had at least one semester of college work prior to admission to Annapolis. All such students must enter the Academy as plebes. The Admissions Board requires that applicants furnish transcripts of any college work they have taken.

Tests

Either the College Entrance Examination Board (CEEB) Scholastic Aptitude Test (SAT) or the American College Testing Program (ACT) test is required of each candidate. These tests may be taken at any time they are offered, but not later than February of the year of admission to Annapolis. Candidates interested in advanced placement (validation) are encouraged to take the appropriate College Board Achievement test(s). Since achievement tests are not considered in determining scholastic qualification for admission, they may be taken as late as May.

Test Dates for Candidates for the Class of 1979

	CEEB	ACT
April 6	1974 (SAT only)	February 23 1974
May 4	1974 (Achievement tests only)	April 27 1974
June 22	1974 (SAT only)	June 15 1974
October 12	1974 (SAT only in Calif. & Texas)	October 19 1974
November 2	1974 (SAT only)	December 14 1974
November 23	1974 (Achievement tests only)	February 22 1975
December 7	1974 (SAT only)	
January 11	1975 (Achievement tests only)	
February 1	1975 (SAT only)	

Arrangements to take the SAT or ACT tests can be made through a high school guidance counselor or by writing directly to the College Entrance Examination Board, Box 592, Princeton, New Jersey 08540; or Box 1025, Berkeley, California 94701; or to the Registration Department, American College Testing Program, P. O. Box 414, Iowa City, Iowa 52240.

Some congressmen and other authorized nominators use competitive examinations of the U. S. Civil Service Commission solely to assist them in evaluating and selecting their candidates. These special competitive examina-

tions are a tool to assist in the nomination process, but they do not determine a candidate's scholastic qualifications for admission to the Academy. The Naval Academy requirements for the SAT or ACT tests must still be met.

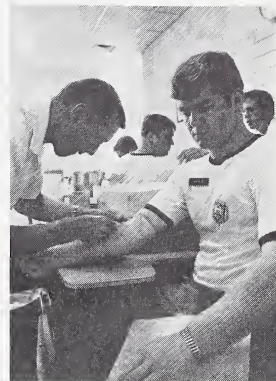
Obtaining a Nomination

A young man must obtain a nomination to be considered for an appointment as a midshipman. It is advisable to apply for nomination *during the spring* of one's junior year in high school, because many members of Congress evaluate candidates during the summer months and some nominate in early fall. Most candidates will be notified of their nomination by the end of January during their senior year. There are many sources of nomination and the young man should apply to *all* sources for which he is eligible, which always include his representative, both senators, and the Vice President. The following is a listing of all nomination sources:

U. S. Senators, Representatives, the Delegate to the Congress from the District of Columbia, and the Resident Commissioner of Puerto Rico. Each may have five midshipmen attending the Academy at any one time. Ten nominations may be made for each vacancy. It is *not* necessary to know the official personally. The candidate should apply directly to his two senators and to the representative from his Congressional district. See appendix A for a sample letter of application.

The President. The President may appoint 100 midshipmen each year. These competitive appointments are limited by law to sons of career officers and enlisted personnel of the Armed Forces, including Coast Guard, who are either on active duty (other than for training) and who have served continuously on active duty for at least eight years, or who are retired with pay or have died while retired with pay (other than those retired under Section 1331 of Title 10, USC—retirement at age 60 for combined active and inactive service of at least 20 years). Application should be made by 15 December to the Superintendent, U. S. Naval Academy (Attn: Candidate Guidance Office), Annapolis, Maryland 21402. See appendix A for a sample letter of application.

The Vice President. Nominating from the United States at large, the Vice President may have five midshipmen attending the Academy at any one time. He nominates ten for each vacancy. Application should be made by 1 September to the Office of the Vice President, Washington, D. C. 20501.





Governors of Puerto Rico, the Canal Zone, the Virgin Islands, Guam, and American Samoa. Residents should apply to the appropriate official.

Regular Navy and Marine Corps. One year of active duty is required by 1 July of the year of admission. Eighty-five appointments are authorized each year. Application should be made to the applicant's commanding officer.

Naval and Marine Corps Reserve. The applicant must be on active duty or a member of a drilling unit, and have served in the reserve for one year prior to 1 July of the year of admission. There are 85 appointments each year. Application should be made to the applicant's commanding officer.

Naval Reserve Officers' Training Corps (NROTC & NJROTC/MCJROTC). There are ten appointments each year. Application should be made to the applicant's professor of naval science or senior naval science/military instructor.

Honor Naval and Military Schools. Three nominations may be made annually by the headmaster of each approved honor preparatory school to compete for ten appointments.

Sons of Deceased or Disabled Veterans and Sons of Prisoners of War or Servicemen Missing in Action. Sons of armed forces members who were killed in action, or who died from wounds, injuries, or disease received while on active duty; or who sustained 100 percent disability from such wounds, injuries, or disease; and sons of servicemen who are currently prisoners of war or missing in action, are eligible. In addition, the sons of civilians who are currently in a POW or MIA status are also eligible. A maximum of 65 appointees may be at the Academy at any one time. Applicants should write to the Superintendent, U. S. Naval Academy (Attn: Candidate Guidance Office), Annapolis, Maryland 21402.

Sons of Medal of Honor Winners. Applications should be made to the Superintendent, U. S. Naval Academy (Attn: Candidate Guidance Office), Annapolis, Maryland 21402.

Sample letters for requesting nominations appear in appendix A. Foreign students should refer to appendix D.

Congressional Nominating Procedures

For each vacancy he has at the Academy, a Congressman may nominate ten candidates. He may designate them as "principal," "1st alternate," "2nd

alternate," and so on to "9th alternate"; he may nominate a principal and nine competitive alternates, for evaluation by the Naval Academy; or he may simply nominate a slate of ten competitors to be evaluated by the Naval Academy for the vacancy. In all cases, the vacancy is filled by the top man on the list who is accepted for admission by the Academy. But this does not mean that the others are no longer considered. In fact, if particularly well qualified, it is possible that they all may be accepted for admission as qualified alternates or competitors.

Admission of Qualified Alternates and Competitors

Each year the Naval Academy admits several hundred qualified alternates and qualified competitors to bring the entering class to the desired number. Thus, a young man nominated by a member of Congress, but not appointed to fill his vacancy, is still considered on a competitive basis for Annapolis, if he is qualified. No special application is necessary, as *all* qualified candidates will be considered automatically by the Academy's Admissions Board.

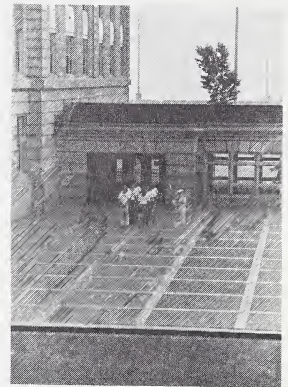
Readmission of Former Midshipmen

In addition to obtaining a new nomination and completing the other normal admission requirements, approval of the Naval Academy's Academic Board is required for readmission of former midshipmen. Requests should be addressed to the Dean of Admissions.

Medical Examination

Applicants must pass a very thorough medical examination designed to ensure that they possess the physical and mental fitness and the personality and behavior characteristics necessary for adjustment to service life and to carry out the rigorous demands of the Naval Academy program. Physically fit young men in good health and who have normal vision usually have little difficulty in passing the examination. Candidates should carefully review the detailed physical standards contained in appendix B. Candidates having less than 20/20 uncorrected vision and/or having defective color vision should take careful note of the Eyes and Vision section, appendix B. Those who wear contact lenses must comply with special examination procedures.

All physical examinations of candidates are conducted at designated Department of Defense medical examining centers. Examinations will be conducted





only for those candidates who have been officially scheduled by the Department of Defense Medical Review Board (DODMRB), a tri-service agency responsible for scheduling and evaluating examinations for all of the U. S. service academies. Congressional sponsors or (in the case of non-Congressional types of nominations) the Naval Academy will provide each new candidate with a franked Authorization for a Service Academy Medical Examination Card which is to be completed by the candidate and forwarded to the DODMRB. The board will schedule the examination at the examining center nearest the candidate's home. The candidate *must* provide his Social Security number on the card.

Notification of Qualification and Selection for Appointment

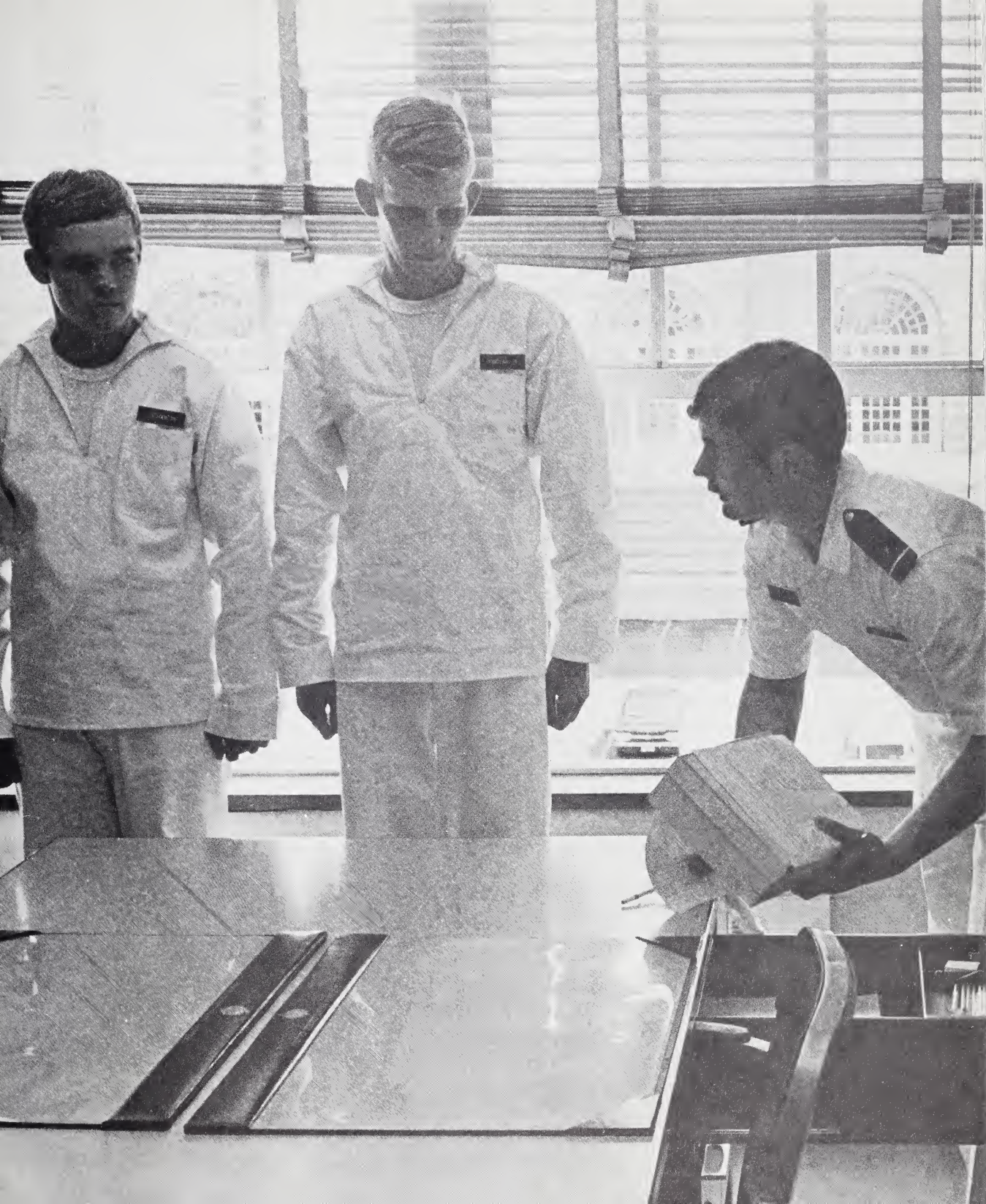
All candidates are notified of their qualification status by 15 April. Offers of appointment are made on a continuing basis from 15 October to 1 May. Fully qualified candidates who have not been offered an appointment by 1 May will, in all probability, not be selected. The new class is admitted in early July.

Pay and Expenses

The pay of the midshipman is \$300.45 per month, commencing on the date of his admission. This salary permits him to pay his own expenses; i.e., for uniforms, books, equipment, laundry, income tax, and spending money while at the Naval Academy. On graduation day, the average midshipman will have accrued savings of approximately \$1,500.00 in his account in addition to his complete seabag of officer uniforms.

Before being admitted as a midshipman, each candidate must deposit with the midshipmen's storekeeper the sum of \$300, to be used in partial payment for uniforms, clothing, etc. In cases of extreme hardship this sum may be reduced to \$100, in which case money allowances for the individual will be reduced until the individual's account reaches prescribed levels. The amount deposited is not refunded, but is expended at entrance for clothing, uniforms, etc., which become the property of the midshipman.

The regulation entrance outfit, plus the additional uniforms, clothing, textbooks, and expenses required the first year, are valued at approximately \$2,000. The deposit made at the time of entrance is supplemented by an entrance credit of \$600 upon first admission to the Naval Academy. The \$600 credit is an interest-free loan advanced by the government to defray the cost of the uniforms and equipment required during the first year. Repayment of the indebtedness is accomplished by monthly deductions of \$40 from the





midshipman's pay, beginning in February of the first year at the Naval Academy and continuing until the indebtedness is liquidated.

Service Obligation

Candidates entering the Naval Academy from civilian life, who have not previously acquired a military obligation, will automatically do so upon acceptance of appointment as midshipmen at the U. S. Naval Academy. Under Section 651 of Title 10, U. S. Code, any person who is enlisted, inducted, or appointed in any of the armed services or their reserve components acquires automatically a six-year military obligation. Section V.A.1. of Department of Defense Directive 1332.23 of 9 May 1968 includes appointees to the service academies among those who are subject to the six-year obligation. Of this six-year obligation, five years are to be served by Naval Academy graduates as commissioned officers on active duty.

Enlisted members of the armed forces who accept appointments as midshipmen at the Naval Academy will not be discharged from their enlistment contracts or from their period of obligated service while they are in the status of midshipmen, except for physical disability or because of the acceptance of a commission. (Act of 25 June 1956, 1-2, re-enacted 10 U. S. Code 516.) Midshipmen in this category who are separated from the Naval Academy—except for one of the two reasons given above—will have their appointments as midshipmen terminated and will immediately resume their enlisted status. Members so reverted will be required to serve out their enlistments or obligated service, unless sooner discharged. In computing the unexpired portion of an enlistment contract or period of obligated service, the time served as a midshipman shall be counted as time served under such contract or period of obligated service.

Agreement Signed by Entering Midshipmen

Upon admission, each midshipman who is a citizen of the United States will be required to sign an agreement, with the consent of his parents or guardian if a minor, that he will fulfill these obligations:

He will complete the Academy course of instruction (unless he is disenrolled from the Academy by competent authority).

He will accept an appointment and serve as a commissioned officer on active duty in the U. S. Navy or U. S. Marine Corps for at least five years immediately after graduation.

If authorized to resign from the Regular Navy before the sixth anniversary of his graduation, he will serve as a commissioned officer in the Naval Reserve until the sixth anniversary.

Resignations and Separations

Fourth and third classmen (freshmen and sophomores): A resignation tendered by a fourth or third classman (or a resignation tendered by a second classman prior to the beginning of the second class academic year) will be accepted when found to be in the best interests of the service.

Second and first classmen: After the commencement of his second class academic year, a second or first classman who is separated prior to completing the course of instruction, except for physical disability, unfitness or unsuitability, will normally be transferred to the Naval Reserve in an enlisted status and be ordered to active duty for not less than two years under the provisions of Title 10, U. S. Code 6959b. Where separation occurs as a result of deficiencies that are not considered willful, the active duty provision may be waived.

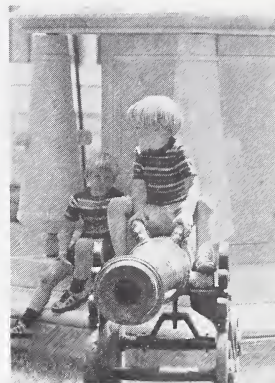
A midshipman who is separated after having entered the Naval Academy from the regular or reserve component of any service will revert to his former status under the appropriate statutory provisions. Completion or partial completion of a prior service obligation by a separated midshipman who entered from this status does not necessarily exempt him from transfer to a reserve component and call to active duty in accordance with Title 10, U. S. Code 6959b.

Refusal to accept commission: Any first classman who completes the course of instruction and declines to accept an appointment as a commissioned officer will be transferred to the reserve component in an appropriate enlisted status and ordered to active duty for four years.

Officers of the armed services serve at the pleasure of the President. No terminal dates are established for their commissions.

Pre-Annapolis Scholarship Assistance

The U. S. Naval Academy Foundation, Inc., is a tax-exempt, nonprofit organization which provides an educational assistance program to enable deserving high school graduates to enhance their qualifications for admission to the Naval Academy. The Foundation is chartered for educational purposes under





the laws of the State of Maryland. The Foundation's program is authorized and approved by the National Collegiate Athletic Association, and its aims are fully supported by the Superintendent of the Naval Academy.

The Foundation provides a limited number of post-high school preparatory scholarships annually to young men seeking admission to the Naval Academy to prepare for a career in the Navy or Marine Corps. Cash grants for these scholarships are made to participating junior colleges and preparatory schools in various parts of the nation. Parents of young men selected for this program are expected to contribute financially within their capabilities. The Foundation offers no assistance other than counseling to individual boys in obtaining nominations.

Application should be made to the Executive Director, U. S. Naval Academy Foundation, Inc., 48 Maryland Avenue, Annapolis, Maryland 21401. Applications should be received by 1 April each year, although a limited number of later applications can be considered.

Naval Academy Preparatory School

The Naval Academy Preparatory School, located at Bainbridge, Maryland, has prepared servicemen for entry into the Naval Academy for over half a century. Enlisted men are enrolled at the school from September to May each year. The class is usually about half from the Regular Navy and half from the Naval Reserve.

Applicants presently in a regular or reserve military status should apply through their commanding officers in accordance with current service directives. Students are selected competitively based on a review of their records, including academic transcripts, the recommendations of their commanding officers, and their scores on the Navy General Classification tests.

Additionally, each year, the Naval Academy selects a number of the most promising and highly motivated of those civilian nominees who have indicated that they were interested in attending the Preparatory School in the event they were not successful in being selected for admission to the Naval Academy. Those selected are offered the opportunity to enlist in the Naval Reserve for the express purpose of attending the Preparatory School. Details concerning this program, including how to apply, are provided each candidate by the Naval Academy.

The Preparatory School offers college preparatory work in mathematics, physics, chemistry, and English. Students with appropriate backgrounds and





abilities are able to undertake more advanced work, including courses at the college freshman level. Military training, physical training, and intramural and varsity sports programs complete the school's schedule.

Precandidate Questionnaire

Each applicant should submit a Precandidate Questionnaire to the Naval Academy in the spring of his junior year, or as soon thereafter as practicable. The Academy will open the applicant's pre-admission file upon receipt of the questionnaire. Information gathered in this file will be used by the Academy to provide the applicant's Congressman with periodic status reports, including a preliminary evaluation of the applicant, the results of his medical examination, and other information which may assist him in being selected for a Congressional nomination. Precandidate Questionnaires should be requested from the Director of Candidate Guidance, U. S. Naval Academy, Annapolis, Maryland 21402.

Candidate Guidance

The Candidate Guidance Office in Leahy Hall at the Naval Academy provides counsel to young men who are interested in a career of naval service through Annapolis. This office also coordinates the nation-wide activities of some 1,300 selected Naval Reserve officers, not on active duty, and civilians who have been designated Naval Academy Information ("Blue and Gold") Officers. These officers are qualified to counsel you on all aspects of admission and are in close contact throughout the year with officials at Annapolis. Appendix E lists the State/Area Coordinators of this program. If, after reading this catalog, you have a question about the Academy or admission procedures, write to the coordinator nearest you or to:

Superintendent
U. S. Naval Academy
(Attn: Candidate Guidance)
Annapolis, Maryland 21402

Candidates living on the West Coast may write

West Coast Regional Candidate Guidance Office
NAS Drawer A
Moffett Field, California 94035

If you plan to visit Annapolis, the Academy is open to visitors seven days a week from 8 a.m. to 5 p.m. A guidance counselor will be available to talk with you any weekday and on Saturdays from 9 a.m. to noon.

Questions and Answers

Over the years it has been the experience of the Naval Academy that a great many misconceptions exist concerning admission procedures, methods of obtaining nominations, qualifications, and other factors pertaining to selection and admission. The following questions are those most often asked by prospective candidates and the answers may help you to clear up any doubts or misunderstandings you may have concerning this all-important subject.

Q. Who can become a midshipman?

A. Admission is open to young men of good moral character, without regard to race, creed or national origin. Candidates must be male citizens of the United States, unmarried and having no children, who are at least 17 years of age but not past their 22nd birthday on 1 July of the year of admission.

Q. What must I do to become a midshipman?

A. Obtain a nomination, qualify scholastically (acceptable entrance examination scores—either American College Testing Program (ACT) tests or College Entrance Examination Board Scholastic Aptitude Test (SAT); acceptable secondary school record, including college-preparatory work; top 40 percent of class), and meet prescribed medical and physical standards. Be selected for an appointment.

Q. Where may I obtain detailed information on admission requirements?

A. Information may be obtained from the Naval Academy Information Officer in your area, from high school guidance counselors, from your local Navy recruiter, from the West Coast Regional Candidate Guidance Office, NAS Drawer A, Moffett Field, California 94035, or by writing to the Candidate Guidance Office, U. S. Naval Academy, Annapolis, Maryland 21402.

Q. I don't know my congressman. How do I get a nomination?





A. It is not necessary to know him personally. Apply to your Congressional representative and to both of your U.S. senators by mail; your application will be considered carefully. Each member of Congress is authorized to have five of his appointees attending the Academy at any one time. And each member is authorized to nominate up to *ten* candidates for each vacancy. The essential thing to remember is that, by law, you *must* have a nomination to be considered for appointment to the Naval Academy. Once you are nominated, you officially become a candidate and your record is then evaluated by the Naval Academy on its merits. Even if you are not selected to fill a congressman's vacancy, if you have one of his nominations and have a good school record and otherwise meet the basic entry standards, you will have an excellent chance to become a midshipman. Each year several hundred of the best qualified alternate Congressional nominees are appointed to the Naval Academy by the Secretary of the Navy to bring the entering class up to authorized strength.

Q. I am a member of the Naval Reserve. How can I get into the Academy?

A. A minimum of 85 enlisted reservists (Navy and Marine Corps), on active duty or members of drilling units, may qualify to enter the Academy each year. See your commanding officer for details.

Q. If I am eligible for both Congressional and Presidential nominations, can I request nomination from more than one source?

A. Yes, and you should do so. The more nominations you obtain, the better chance you will have for selection if you are found fully qualified.

Q. Is it difficult to enter the Academy directly from high school?

A. No. Nine out of ten midshipmen enter directly from high school or prep school.

Q. My grades were about average, but I played in sev-

eral sports and was student body president. Also, I had to work after school. Will these activities help me?

A. Yes. Evidence of leadership ability and participation in extracurricular activities, including athletics and part-time jobs, carries considerable weight in the candidate evaluation process.

Q. I have a high IQ and am a straight-A student. Will most of my time be spent on military subjects, or may I take any electives, such as electrical engineering?

A. From 23 to 38 percent (depending on the major selected) of the Academy's curriculum is devoted to professional military studies; but at the Academy you will complete at least 140 rather than the 120 semester hours typical of most civilian colleges. There are 26 academic majors offered, from Far Eastern studies to mathematics to electrical engineering. Advanced research projects are offered in these and many other areas.

Q. What part of the medical examination gives the most difficulty to candidates?

A. The eye examination. Visual acuity of 20/20 is required. However, a limited number of outstanding candidates may be granted waivers for visual acuity if the refractive error is not excessive and the vision is correctable to 20/20. If within waivable limits, and otherwise fully qualified for admission, you will be considered *automatically*, based on your overall record, for a waiver by the Academy's Admissions Board. Since only a very limited number of nominees may be granted a medical waiver, the competition for the available waivers is very keen. It should be noted that *all* nominees within waivable limits (and otherwise fully qualified), including principal nominees of members of Congress, must compete for these waivers.

Q. I don't like sports. Do I have to try out for anything?

A. If you really dislike sports, then the Naval Academy may not be the best school for you. A midshipman is re-





quired to participate in athletics, either varsity or intramural, for the development of his character, physical fitness, and competitive spirit.

Q. How much does it cost to be a midshipman at the Academy?

A. Tuition, room and board, and medical and dental care are provided by the government. In addition, midshipmen receive a monthly salary of \$300.45 for uniforms, books, and personal needs. Salary and the value of the daily ration allowance (\$1.78/day) accrue to a midshipman's pay account while he is on leave. A \$300.00 deposit is required on entry.

Q. How often may I visit home?

A. During Christmas and spring leaves. In addition, month-long summer leaves are granted to the three upper classes. You must pay for your own travel.

Q. How many flunk out?

A. Losses run approximately 33% over the entire 4-year program for an average class. About one-third of these are academic failures.

Q. Do I get to fly?

A. All midshipmen receive flight indoctrination in naval aircraft during their third summer. After graduation, selected volunteers receive flight training leading to designation as aviators in the Navy or Marine Corps.

Q. Do I get to choose any of my courses?

A. Yes, you will choose your major and the majority of your courses. The great majority of midshipmen get their first choice of a major. Occasionally, however, in order to better meet the future needs of the Navy, a midshipman must accept his second choice.

Q. How much social life would I have at the Academy?

A. Social life is limited during the first year. After the initial (plebe) year, there is a wide range of social activities available. There are weekend dances and other extra-

curricular activities at the Academy, and there are opportunities for afternoon liberties in town and for a number of weekends away from the Academy.

Q. I am a high school freshman. When should I start preparing myself for the Academy?

A. Now! Your entire four-year high school record in academics and in athletics and other extracurricular activities will be evaluated by the Naval Academy.

Q. I am in college now. Is it too late to enter the Academy?

A. No. As long as you will not have passed your 22nd birthday on 1 July of the year of admission. Prior college work will permit study of advanced courses at the Academy. Normally, about eight percent of the members of each entering class have been in a civilian college prior to entering the Naval Academy.

Q. If I failed to receive an appointment for one class, am I eligible to apply again?

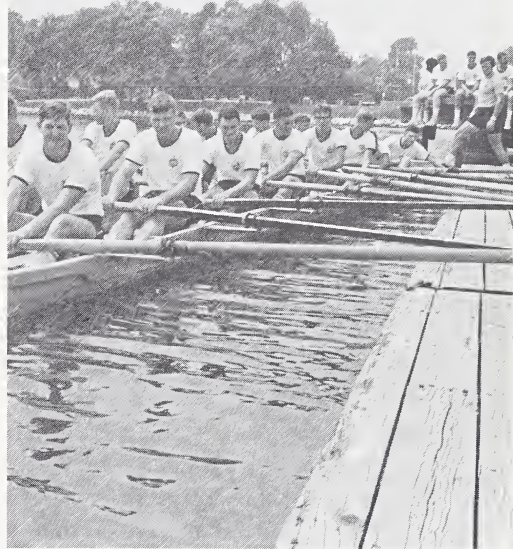
A. Yes. But a candidate who failed to be selected for an appointment in a previous year must obtain a new nomination and complete the entire admissions process in order to again be considered for an appointment. Also, each year, a number of the most promising of the unsuccessful candidates are invited by the Naval Academy to enlist in the Naval Reserve for the express purpose of attending the Naval Academy Preparatory School. They then become eligible for a Secretary of the Navy nomination.

Q. When should I apply?

A. Apply to your Congressional representative or senators for a nomination, whenever possible, in the spring of your junior year in high school. Although a few apply as late as December of their senior year, this is not advised since most members of Congress will have selected their nominees by this time.

Q. What is my military obligation on graduation?

A. The total military service obligation of an Academy





graduate is six years. Current directives require five of these to be on active duty as a commissioned officer in the Navy or Marine Corps.

Q. Can I become a Navy physician or dentist?

A. No. Although there was a limited program for pre-medical training at the Naval Academy in the past, recent Congressional legislation has directed that such programs be discontinued at all the service academies. If your primary interest is to be a Navy doctor or dentist, it is recommended that you attend a civilian college offering pre-medical studies. The Navy does have scholarship programs available to college seniors who have been accepted into an accredited medical school.

Q. Does the Naval Academy have a pre-law major?

A. There is no pre-law program at the Naval Academy. The Navy obtains most of its law officers from civilian sources.

Q. My father was in the armed forces. Will this help me to get a nomination?

A. Sons of career members of the regular and reserve forces who are on active duty or who are retired may be considered for a nomination under the Presidential category.

Q. What types of majors are offered at the Academy?

A. The 26 majors offered by the Academy include analytical management, aerospace engineering, history, ocean engineering, English, European studies, physics, and many others.

Q. Where do midshipmen live?

A. They are housed in one building, Bancroft Hall, perhaps the largest dormitory in the world. Bancroft Hall has more than 4.8 miles of corridors and 33 acres of floor space. Each room has its own shower and all rooms have been remodeled in recent years. The Midshipmen's Ward-

room is also located in Bancroft Hall. Here all 4,200 midshipmen are able to sit down and eat at one time. The food is served family style. Bancroft Hall is named after George Bancroft who was Secretary of the Navy when the Naval Academy was founded. The Hall contains a store, medical and dental facilities, and a soda fountain, bowling alleys, and numerous other facilities.

Q. I have nominations to both the Naval Academy and the Air Force Academy. Is it necessary that I undergo two medical examinations?

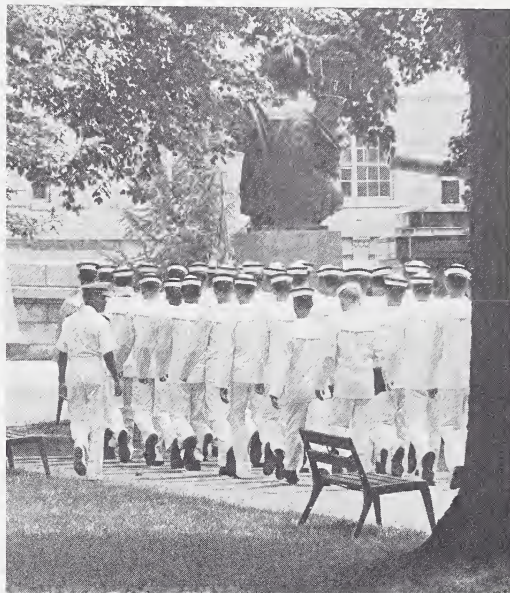
A. No. A single Qualifying Medical Examination conducted at any of the military examining centers designated by the Department of Defense Medical Review Board is acceptable for all service academies.

Q. What reasons are given most frequently by plebes who resign from the Academy?

A. We have found that resigning plebes most frequently say:

(1) They came to the Academy under parental pressure. After a few weeks as plebes, they feel that they have fulfilled their obligation to their parents and resign.

(2) They were attracted to the Academy by its glamour. They knew that the academic program was demanding, but they failed to realize the extent of the daily demands made on their time by the military and professional aspects of the training at Annapolis. Some, apparently, were expecting more of a relaxed, college-type NROTC program than the regimen of a service academy.





VI. The Curriculum Challenge

A young man entering the Naval Academy can be confident that the professional education and training at Annapolis will give him the knowledge and skills he will need to perform his future military duties effectively. The development of professional officers has been central to the objectives of the Naval Academy since its founding over 125 years ago. It is today. But today's Naval Academy offers considerably more. As a professionally-oriented academic institution, it offers in-depth studies in 26 major programs. The curriculum is demanding, and its many choices are designed to challenge each midshipman in terms of his own academic aptitudes and interests.

The day is long past when every line officer could be expected to embody all the qualifications and specialties desired or needed in a naval career. Today's Naval Academy, therefore, does not seek to give the same all-inclusive educational package to every graduate. Rather, it undertakes to produce in every graduating class a group of individual line officers—all well trained in basic professional subjects—who collectively possess the wide range of knowledge and capabilities demanded of the officers in our modern Navy.

To attain breadth in his education, each midshipman must satisfy certain minimum course requirements in social sciences and humanities, mathematics and science. To ensure depth, he completes a major sequence from a variety of fields designed to provide him with the academic background necessary for effective leadership in today's Navy. Consistent with the Navy's technical orientation is the Academy's minimum goal of having 40 percent of the midshipmen major in one of the engineering disciplines and 30 percent in one of the physical sciences, math, or operations analysis. The remaining midshipmen would major in one of the humanities or social sciences, or in analytical management.

The Navy has an ever-increasing need for officers educated in the engineering disciplines and thus offers extensive opportunities to its officers for graduate work and career specialties or subspecialties in engineering programs. All engineering majors offered by the Naval Academy, except engineering



physics and general engineering, are accredited by the Engineering Council for Professional Development and lead to designated engineering degrees.

Choosing a Major

A midshipman's choice of a major governs the number of related and supporting courses he will require in science, engineering, mathematics, or foreign languages. Majors in the scientific-technical fields entail more courses, at higher levels, in mathematics, science, and engineering, for example, than do non-technical majors. The scientific-technical programs require no foreign language. On the other hand, programs in social sciences, international studies, and English require a substantial amount of foreign language study, but only three semesters of mathematics.

Some plebes are sure of their study preferences and their academic aptitudes when they first arrive at the Academy. However, a midshipman is normally not ready to make a firm major selection at the beginning of his plebe year. He may have a general idea of his area of interest, without being sure of which major he should take. He may not yet know whether his talents lie in a technical or nontechnical field. And, during his plebe year, he may very well discover that his real interests and abilities do not fit the requirements of the major fields he first considered.

For these reasons, selection of a major is delayed until near the end of the Common Plebe Year when the midshipman has had nearly two semesters of meaningful academic experience in fundamental courses which test his ability and help him to evaluate his strengths and weaknesses.

The Common Plebe Year

During his first year at the Naval Academy each midshipman is placed in a program of study suited to his abilities and academic background. These courses are broad enough in scope to provide a sound basis for the selection of a major during the latter part of the year. At the same time they contain an element of commonality which enables the midshipman to progress into any of the 26 majors offered. They include the naval science courses which start his professional development. The normal academic load for a plebe consists of six courses each semester as follows:

The Common Plebe Year

First Semester			Second Semester		
NS101	Fundamentals of Naval Science	2-2-3	EW102	Introduction to Naval Engineering & Weapons Systems	3-0-3
HH101	History of Sea Power I	3-0-3	HH102	History of Sea Power II	3-0-3
*	Calculus I	4-0-4	*	Calculus II	4-0-4
*	English Composition and Literature	3-0-3	*	English Composition and Literature	3-0-3
*	Chemistry	3-2-4	*	Chemistry	3-2-4
SI101	Introduction to Computing I	1-0-1	SI102	Introduction to Computing II	1-0-1

**16-4-18

17-2-18

* Offered at several levels depending on the background and academic ability of the midshipman. In the case of Calculus I, the lowest level is a pre-calculus course, SM005, for midshipmen whose academic background has not adequately prepared them for calculus. It does not count as part of the minimum mathematics requirement.

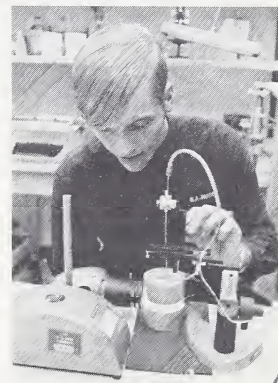
** 16 hours of classroom recitations per week; 4 hours of laboratory work per week; 18 total semester hours credit.

Fundamentals of Naval Science (first semester) and Introduction to Naval Engineering and Weapons Systems (second semester). These courses provide the midshipman with knowledge and skills for practical shipboard use during his youngster cruise, the most important event of third-class summer. They also serve as preparation for the professional courses and training which come during the next three years.

History. The year's study of the history of sea power is designed to give a sense of naval professionalism and an understanding of the role of sea power in world affairs.

Mathematics. A year of calculus provides the requisite mathematical foundation for further study in the various majors. Midshipmen are placed in a sequence appropriate to their backgrounds and ability.

Composition and Literature. This is a general requirement designed to develop the skills in thinking, reading, and writing which are primary tools for further education and for professional development. Six different courses are offered to ensure that each midshipman gets training in communication skills at the level best suited to his needs and stage of development.





Chemistry. A year of study is required in this basic discipline. Midshipmen are placed in course sequences of varying difficulty depending upon their ability and background.

Computer Science. Each midshipman is introduced to the use of the computer during plebe year. Computers are becoming increasingly important in virtually every aspect of the modern Navy, and midshipmen will be expected to use them as tools in a number of their Naval Academy courses.

Advanced Placement

Prior to entering the Naval Academy, many midshipmen take courses equivalent to those offered or required here. Credit may be granted for this work through validation, a procedure based on examinations given by the appropriate academic departments; consideration of transcripts; and results of College Entrance Examination Board Achievement Tests and Advanced Placement Tests, if available. Validators of any of the plebe courses may be enrolled in more advanced courses during plebe year, if they desire, or they may elect to carry a lighter academic load. More than one-half of the members of a plebe class validate at least one course.

Counseling and Guidance

Each midshipman is responsible not only for deciding upon his major, but also for selecting his specific courses and planning his semester schedules. He may thus set, within certain limits, the pace of his studies to match his capabilities. If he is an average student, for example, he will likely take sequential courses as they are laid out for normal progress in a given major program. If he is ready for advanced placement in some subjects, or is able to handle more than the standard number of courses, he may complete his requirements more rapidly and gain time for more elective courses. Some midshipmen may even complete second majors.

Although decisions regarding his academic program must be his own, the midshipman has ample opportunities for consultation with faculty members. During his first few weeks at the Naval Academy, he receives about 20 hours of group and individual counseling on all aspects of the curriculum. He takes a number of achievement tests to help determine the levels at which he should begin his studies.

Because of the commonality of plebe year, individual academic advisers are not assigned to the midshipmen until a major is chosen, normally in the spring of plebe year. The midshipman's adviser, a faculty member from the

department in which he has expressed a particular interest, will help him define his study objectives and will offer guidance towards a logical selection of courses. In addition to offering guidance in the selection of courses and in scheduling, the faculty adviser concerns himself with the midshipman's over-all academic progress and any academic problems he may have from plebe year through graduation.

Nuclear Power Program

Midshipmen have the opportunity to apply in the fall of their senior year for training in nuclear propulsion upon graduation. Candidates selected undertake six months study in Nuclear Power School, Bainbridge, Md., or Vallejo, Cal., followed by six months training at one of three nuclear reactor prototype sites in Idaho, New York, or Connecticut. Completion of the year's training leads to assignment in a nuclear powered surface ship or submarine, the choice being the individual's. Midshipmen who aspire to duty in one of these exciting ships can acquire a strong foundation by majoring in engineering, science, or mathematics. Judicious choice of elective courses in the scientific/technical area and energetic application to the entire academic program improve the humanities or management major's chances for selection into the program. Each midshipman selected for nuclear propulsion training by the Director, Division of Naval Reactors, AEC, regardless of his major, takes one of several mathematics, science, or engineering courses the second semester of his senior year to enhance his preparation for Nuclear Power School (shown as NPP in the professional requirements listed with each major in the following chapter).



Professional Course Requirements

A series of professional courses is required for the Bachelor of Science degree. In addition to providing the professional background required of an officer during his first few years in the Fleet or the Marine Corps, these courses contribute to more effective summer training with the Fleet. Because the professional courses required subsequent to plebe year vary slightly, depending on the majors program being followed, those requirements are specified with descriptions of the various majors beginning on page 85.

Distribution Requirements

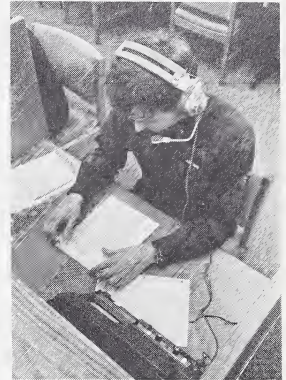
To assure a broad general education and to provide a sound background for further study in selected majors, midshipmen must satisfy certain distribution requirements in the humanities, social sciences, mathematics, science, and



a modern language. These requirements are specified with descriptions of the various majors.

Academic Organization

The major areas under the direction of the Academic Dean are organized into five divisions—the Divisions of Engineering and Weapons, Mathematics and Science, Naval Command and Management, U. S. and International Studies, and English and History—each headed by a Navy captain. The divisions are further subdivided into departments, 19 in all, which serve as focal points for the administration of the majors program and for the continuing review and development of the curriculum. The departments are chaired by civilian or military members of the faculty.



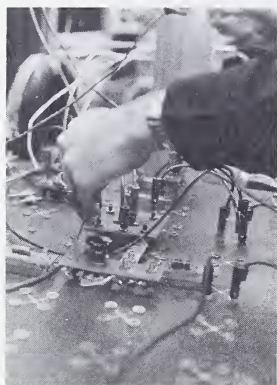
The Nimitz Library

The Nimitz Library, completed in 1973, provides midshipmen and faculty members with comprehensive library service in support of the curriculum, research, and recreational reading. A representative book collection is maintained in all fields of knowledge, and the library is especially strong in naval science and history. In addition, the excellent resources of the libraries in the Washington and Baltimore areas are available to midshipmen and faculty members. Anticipated developments in the library include the application of data processing and closed circuit television techniques to library routines in order to provide more modern and efficient service.

The library has a capacity of approximately 650,000 volumes and accommodates between 1,400 and 1,500 readers, utilizing a seating combination of study tables, study carrels, and lounge furniture. Included in the building are seminar, faculty and group study rooms, typing and calculating rooms, audio and video carrels, and a computer terminal room. The Naval Academy Archives, the Division of U. S. and International Studies, the Educational Resources Center, and the Naval Academy Photographic Laboratory are also housed in the Nimitz Library.

Special Programs

Trident Scholars. Under the Trident Scholar program, initiated in 1963, a limited number of exceptionally capable midshipmen carry out independent research and study during their senior year. Each scholar has a reduced formal course load, since his research and thesis constitute the main part of his



academic program for the year. He is assisted in his project by one or more faculty advisers who are well acquainted with his field of study.

Grading

The Naval Academy employs the letter grade system, A, B, C, D, and F (A denoting excellence; F, failing), which are in turn assigned a numerical Quality Point Equivalent (QPE) of 4.0, 3.0, 2.0, 1.0 and 0.0 respectively.

Grades are averaged, using a weighted semester-hour system called a Quality Point Rating (QPR). The QPR is computed by multiplying the QPE corresponding to the letter grade received in each course by the semester hours of credit for the course, then dividing the sum of these products by the total number of semester hours represented by all the courses taken. A semester QPR (SQPR) is computed only for courses taken during a given semester; a Cumulative QPR (CQPR) is maintained for each midshipman, and includes all academic marks assigned to date.

An academic probation system provides warning for midshipmen who are not making satisfactory progress toward graduation. If a midshipman's cumulative QPR is below 2.0 at the completion of a semester, he is placed on academic probation for the following semester. A midshipman is also placed on probation for the semester following any two consecutive semesters in which his semester QPR is below 2.0, even though his cumulative QPR remains above 2.0. In addition, a special letter of warning serves to alert midshipmen whose mid-semester academic records are unsatisfactory.

It should be noted that grades received in aptitude, conduct, and physical education, and for certain professional training conducted during the summer, are not included in the computation of QPR. Satisfactory performance is required, however, and these grades are assigned very significant weight in determining class standing.

A midshipman may be recommended for discharge by the Academic Board for failure of two courses in any one semester, falling behind two courses in a given major, failure to achieve a semester QPR of at least 1.5 for any given semester, and failure to fulfill probationary conditions prescribed by the Academic Board.

On the other end of the grading scale, two honor categories are available to midshipmen. The Superintendent's List honors midshipmen attaining a SQPR of at least 3.4 with no grade below C, and with grades of A in aptitude and conduct and B or better in physical education. Additional liberty is granted to midshipmen on the Superintendent's List. Called "star men," they proudly wear





a gold star on the lapels of their uniforms. The Dean's List honors midshipmen with a minimum SQPR of 3.4 with no failure ("F") in any academic course or other area, including professional studies, aptitude, conduct, and physical education.

Graduation Requirements

To qualify for graduation a midshipman must:

- (1) Meet required military-professional standards in professional studies and at-sea training;
- (2) Meet required standards of aptitude for the service, conduct, and physical education;
- (3) Complete the courses specified by the department in which he is majoring;
- (4) Complete 140 credit hours and satisfy distribution requirements;
- (5) Achieve a cumulative quality point ratio (CQPR) of at least 2.00, a "C" average;
- (6) Accept a commission in the U. S. Navy or U. S. Marine Corps if proffered.

All midshipmen who graduate are awarded the Bachelor of Science degree by the Superintendent upon the recommendation of the Commandant and the Academic Dean, as approved by the Academic Board.

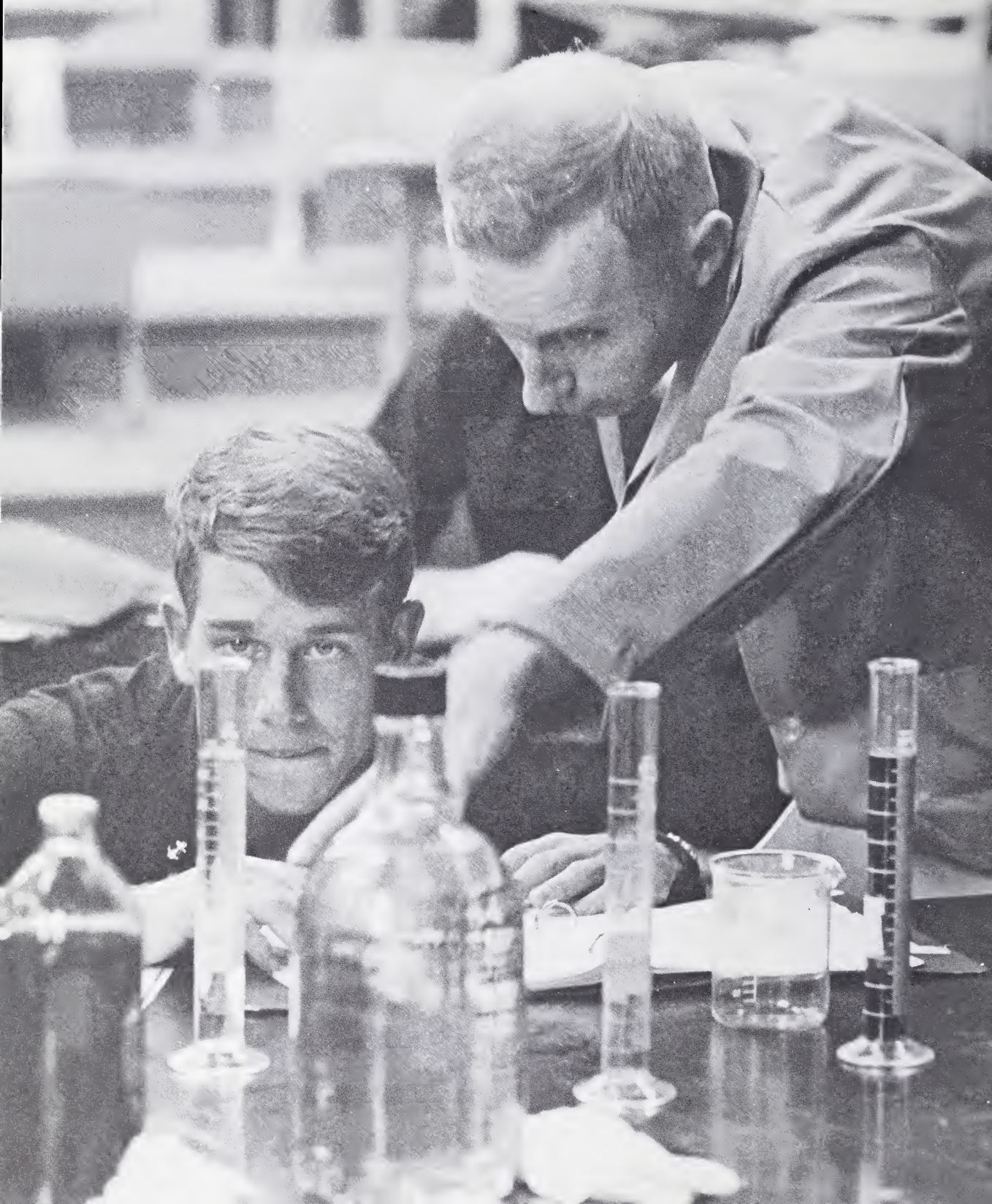
Residence

The curriculum at the Naval Academy is of four years' duration, as required by law. This means that students who validate courses or who can carry extra courses have the opportunity to do additional advanced work, pursue independent study and research, complete the requirements of two majors, or study other subjects for self-improvement or of general interest.

Schedule of Instruction

The calendar year is divided into two semesters and a summer term. The academic year consists of two semesters, each of approximately 16 weeks of instruction and one week of examinations. The normal academic routine provides for five-and-one-half days of classroom, laboratory, and study periods per week. Small classes, averaging 20 midshipmen, provide ample opportunity for active classroom participation by each midshipman and for individual attention to students on the part of the instructor.





VII. The Majors Program

Division of Engineering and Weapons

Department of Aerospace Engineering
Department of Electrical Engineering
Department of Mechanical Engineering
Department of Naval Systems Engineering
Department of Weapons and Systems Engineering

Department of Aerospace Engineering

Aerospace Engineering Major

Aerospace Engineering, an ECPD accredited major, involves the study of compressible and incompressible fluid flows, conventional and advanced propulsion systems, vehicle performance, stability and control, and modern structural mechanics. It deals primarily with the analysis and design of air cushion vehicles, aircraft and spacecraft. Basic principles and sound engineering techniques are stressed.

The curriculum provides for various research projects and choice of a wide variety of electives. Throughout the program extensive use is made of laboratory facilities, which include a flight test aircraft and a small surface effect vehicle. Computer techniques are emphasized for data reduction, design, and graphic display.

A solid foundation is laid which permits postgraduate work in a number of fields. A Bachelor of Science in Aerospace Engineering is awarded.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212 plus one elective;



Science: SP211, SP212;

Humanities/Social Sciences: HE300*, FE210 plus three electives;

Language: none;

Special: EN201, EM213, EM216, EM311, EM317, ES410, EE331, EE332;

Major: EA210, EA311, EA321, EA331, EA413, EA433, EA440 plus three approved electives.

* Taken during second class summer

Aerospace Engineering Courses

EA110 Introduction to Aerospace Engineering (1-0-1). Provides a broad overview of aerospace engineering, with a brief history of flight and a description of various flight vehicles and the aerospace environment. Aerospace engineering disciplines are presented, and the roles of the aerospace engineer in industry are discussed.

EA210 Flight Performance I (3-0-3). Introduction to fluid mechanics as applied to the flight vehicle and its performance. Development of aerodynamic forces and moments, including viscous and compressibility effects are discussed. Methods for determining subsonic performance including the estimation of drag, power available, range, endurance, climb, take-off and landing are studied. *Prereq:* SM102 or SM112, SP211.

EA311 Aerodynamics I (3-2-4). A study in perfect fluid theory encompassing the basic principles of aerodynamics and their application to specific problems. *Prereq:* EA210, SM212.

EA321 Aerospace Structures I (3-2-4). An application of the principles of solid mechanics to the special requirements of flight vehicle structures. *Prereq:* EM317.

EA331 Gasdynamics I (2-2-3). A comprehensive coverage of the methods of gasdynamics in internal flow systems, including thermodynamics of perfect and real gases and fundamental theorems of one-dimensional compressible subsonic and supersonic flows. *Prereq:* EM312 or EA311; SM212, EM311.

EA340 Computer-Aided Design in Engineering (2-2-3). Engineering design process and its computer adaptation. Topics include capabilities and limitations of various computer types and figures of merit, such as design factor of safety, cost, reliability, and time. *Prereq:* 2/C or 1/C standing, Engineering or Science major; SI102.

EA410 Flight Performance II (3-0-3). The performance of a specific aircraft is determined as a course project. Topical coverage includes powerplant characteristics, finite wing analysis, static and dynamic performance. *Prereq:* EA210.

EA411 Orbital Mechanics (3-0-3). An introductory treatment of the elements of space flight. Included are orbits of planets and satellites, suborbital and escape trajectories, orbital control, rendezvous, transfer, intercept, and orbit determination, optimization of trajectories. *Prereq:* SM212, EM212.

EA412 Aerodynamics II (3-0-3). An advanced course in aerodynamics covering the Navier-Stokes equations, boundary layer approximations, and convective heat transfer. *Prereq:* EA311, EA331; permission of instructor.

EA413 Stability and Control (3-0-3). The aerodynamic and inertial forces and moments acting on the flight vehicle and its component parts are analyzed to determine their effect on static and dynamic stability. *Prereq:* EA210.

EA415 Elements of Flight Test Engineering (2-2-3). An extension of the technical aerodynamics of airplanes pertinent to performance, based upon direct observation of performance parameters during an in-flight laboratory. *Prereq:* EA210; *Coreq:* EA413.

EA421 Aerospace Structures II (3-0-3). Numerical, matrix, and empirical methods of structural analysis. Instability analysis of columns, beam-columns, plates, and shells. Inelasticity problems with an introduction to plasticity and viscoelasticity. *Prereq:* EA321, SM212.

EA422 Aeroelasticity (3-0-3). Analysis of the flexible aircraft including fundamentals of vibrations of structural systems, deformations and motions of aircraft structures, wing divergence, control effectiveness, wing flutter, and aeroelastic testing. *Prereq:* EA321, EA311.

EA431 Gasdynamics II (3-0-3). Non-steady compressible flow analysis including influence coefficients, viscous and thermal effects, detonation and deflagration, shock tube theory, pressure exchange and combustion, dynamic flow machines, and thrust generators. *Prereq:* EA331.

EA433 Flight Propulsion (2-2-3). The principles of fluid dynamics and thermodynamics are specialized to the problem of propulsion of aircraft and space vehicles. *Prereq:* EM311 or EM319, EM318 or EM312 or EA311.

EA435 The Aerodynamics of V/STOL Aircraft (3-0-3). An advanced course covering the aerodynamics of vertical and short take-off and landing aircraft, including fixed wing and rotary wing types, with major emphasis on the helicopter. *Prereq:* Approval of instructor and Department Chairman.

EA440 Aerospace Vehicle Design (1-4-3). Preliminary design of a flight vehicle. Includes preliminary layout, weight and balance estimates, performance analysis, stability analysis, and structural analysis. Detailed consideration will be given to one aspect of the design. *Prereq:* EA433, EA413, EA321.

EA481 Advanced Topic in Aerospace Engineering (3-0-3). A selected topic of a theoretical nature in aerospace engineering is studied which is not covered by regular course work. The application of advanced mathematical methods or technologies is emphasized. Courses such as air cushion vehicles, magnetohydrodynamics, and high temperature flight structures are offered when student interest is indicated. *Prereq:* Approval of instructor and Aerospace Engineering Department Chairman.

EA483 Seminar in Aerospace Engineering (1-0-1). A series of informal group discussions on one or

more special aerospace engineering topics of interest to the seminar group. *Prereq:* Permission of instructor.

EA491-492; EA493-494; EA495-496. Aerospace Engineering Research, Design or Construction Project (0-2-1) (0-4-2) (0-6-3). A creative engineering research, design or construction project in the student's field of interest, entailing a minimum of two, four, or six hours of laboratory, shop, or design work each week. *Prereq:* Approval by Aerospace Engineering Department Chairman.

Department of Electrical Engineering

Electrical Engineering Major

Electrical Engineering, an ECPD accredited major, combines analysis techniques and experimentation to place primary emphasis on fundamental principles. The resulting basic background, supported by the analytical skills developed, equip the graduate for growth and contributions in the expanding and vital fields of electronics, communications, data acquisition, data processing and display which permeate today's Navy. Outstanding research facilities support the program of study. The Bachelor of Science in Electrical Engineering degree is awarded.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NL302, NL451, ES410, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212, SM239, SM311;

Science: SP211, SP222, SP431;

Humanities/Social Sciences: HE300* and four electives courses;

Language: none required;

Special: EM213, EE221, EE221L, EE222, EE321, EM318, EM319;

Major: EE341, EE342, EE421, EE422, EE423; plus at least two of the following: EE431, EE432, EE441, EE442, EE451, EE452, EE461, EE462, EE471, EE472, ES409, ES414 (or ES415), SP411, SP436.

* Taken during second class summer



Electrical Engineering Courses

EE221 Introduction to Electrical Engineering (3-0-3). Analysis principles and concepts using computer support; fundamental parameters and their interaction; numerical methods applied to describe, measure, and compare physical phenomena; development of analytical skills for subsequent course work.

EE221L Introduction to Electrical Laboratory (0-2-1). A heuristic approach to the use of safe and appropriate experimental procedures; familiarization with electrical/electronic components, instruments, and techniques.

EE222 Circuit Analysis I (3-2-4). Definitions and units. Experimental laws, network theorems, and general analysis techniques including graphical analysis. The transient, forced, and complete response of basic circuits. Sinusoidal analysis and the phasor concept. *Prereq:* EE221; *Coreq:* SP222.

EE311 Naval Electricity (3-2-4). Definitions and units: charge, current, voltage, and power. Elementary AC circuits and analysis techniques. Shipboard systems of electric power generation and distribution. AC and DC machinery; internal shipboard communications. *Prereq:* SP202.



EE312 Naval Electronics (3-2-4). Ideal diodes and the transistor; elementary amplifiers, feedback systems, oscillators; modulation and detection. Naval communications systems, including transmitters, receivers, transmission lines, and antennas. Radar, electronic counter-measures, and sonar systems descriptions. *Prereq: EE311.*

EE313 Electronic Systems (3-2-4). Application of electronic techniques to data acquisition and signal conditioning; waveshaping and information display. Characteristics of digital and analog circuits; application of these to solve instrumentation problems through use of integrated circuits.

EE321 Engineering Circuit Analysis II (3-2-4). Gain and impedance characteristics of two-port networks. Three-phase circuits. Network topology. Signal flow graphs. Fourier analysis. State variable method of analyzing linear, non-linear, and time-varying circuits. *Prereq: EE222.*

EE331 & EE332 Electrical Engineering I and II (3-2-4, 3-2-4). Electrical principles; analysis techniques. Transient and steady-state conditions in electric circuits; principles of electromechanical energy conversion; vacuum and solid-state devices in amplifiers, oscillators, modulators, receivers, and logic circuits. *Prereq: SP221, SM211.*

EE333 Electrical Engineering III (3-2-4). Electrical and electronic systems for measurement and instrument applications. Electrical methods for sensing non-electrical quantities. Substitution and comparison techniques; data processing, transmission and display. *Prereq: EE332.*

EE341 Electronics I (3-2-4). Vacuum and semiconductor diodes, vacuum triodes, and transistors. Physical electronics with primary emphasis on semiconductor devices. Small-signal models of vacuum tubes and transistors. Transistor biasing and stabilization. *Prereq: EE222.*

EE342 Electronics II (3-2-4). Current, voltage, and power gains of single and multistage amplifiers. Frequency response of amplifiers. Feedback effects on stability and other characteristics. Tubes, field-effect transistors, photoelectric devices, and integrated circuits. *Prereq: EE341.*

EE421 Energy Conversion (3-2-4). Electromagnetic devices in power and control systems; transformers, AC and DC motors and generators, servomotors, tachometer generators and synchros. Equivalent-circuit analysis of steady-state and transient behavior. *Prereq: EE220 or EE332, or permission of the instructor.*

EE422 Communications Electronics (3-0-3). Intelligence transmission by electromagnetic waves; navigational systems; depth, range, and altitude finders. Missile guidance, anti-collision devices,

satellite telemetry systems. Consideration of limitations imposed by noise contamination. *Prereq: EE342 or EE332, or permission of the instructor.*

EE423 Communication Systems Project Laboratory (0-4-2). Basic analog and digital communication systems. Preparation for project through classes, homework, demonstrations, and laboratory experiments. Project centers on communication systems design and construction. Work divided among individuals or groups. *Prereq: EE342.*

EE424 Electronic Instruments and Measurements (2-4-4). Philosophy and technique of electrical measurement; definitions of sensitivity and error; fundamentals of error analysis. Substitution and comparison measurement methods. Basic electronic and analog instruments; instrument and transducer calibration. *Prereq: EE341.*

EE431 Communications Theory I (3-0-3). Mathematics of signals; time and frequency domain characterization of signals; transmission of signals through linear systems; bandwidth. Principles of modulation and detection; AM, FM, PM, transmission lines. *Prereq: SM311.*

EE432 Communications Theory II (3-0-3). Statistical analysis of noise and other random processes. Sampling and quantization of data. Elements of information theory. Digital communication processes. *Prereq: EE431.*

EE433 Communications Engineering (3-2-4). Using the foundations presented in previous courses, practical communications systems are analyzed in depth. Types of systems include AM, FM, PM, and digital. *Prereq: EE432 or permission of instructor.*

EE441 Network Analysis I (3-2-4). Linear, non-linear, and time-varying resistance, inductance, and capacitance. Impulse response and its convolution. State variables. Negative-resistance, oscillation, and limit cycles. Poles and zeroes. Network functions. Computer solution methods. *Prereq: EE222 or Coreq EE332 and permission of instructor.*

EE442 Network Analysis II (3-2-4). Network graphs and Tellegen's theorem. Matrix formulation of node and mesh analysis, loop and cut-set analysis, and state equations. Natural frequencies; network theorems. *Prereq: EE441.*

EE451 Electronic Properties of Materials (3-0-3). Physical origins of material properties; introduction to quantum mechanics. Statistical methods employed to determine bulk properties of matter from microscopic properties; Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics. Emphasis on semiconductors. *Prereq: SP222.*

EE452 Semiconductor Electronics (3-2-4). Application of solid state physics to describe the physical

operation of semiconductor devices. Attention to diodes, unipolar and bipolar transistors, MOS devices, and integrated circuits emphasizing fundamental solid state mechanisms. *Prereq: EE451.*

EE461 Waveshaping Techniques (3-2-4). Design techniques for semiconductor switching circuits. Logic concepts and their use in the study of switching circuits and systems; logic and switching units as registers, adders, multipliers, and other functional circuits. *Prereq: EE342 or EE332.*

EE462 Logic Design (2-4-4). The study and analysis of an automated digital-data system, including computer, processing devices, and data communication sub-system. *Prereq: EE461.*

EE471 Microwave Systems (3-2-4). Electromagnetic fields in open-wire, strip and coaxial lines and wave guides; power and energy relationship; normal nodes; resonant cavities; modes of propagation in stratified media; microwave circuits. *Prereq: SP431.*

EE472 Radar Engineering (3-2-4). Special radar circuits, integration into a complete radar system. Circuits include pulse modulators, display systems, transmitters, duplexing systems, and receivers. Pulse compression techniques for increasing range and range resolution. Automatic tracking. *Prereq: EE471.*

EE478 Naval Sensors (3-0-3). Naval electronic systems: radar and sonar. Radar range equation, fundamental techniques for range and bearing determination. Circuits with distributed parameters. Antenna directivity, techniques for steering arrays. System design considerations. *Prereq: EE342.*

EE479 Electromagnetic Waves (3-0-3). Electric and magnetic fields, Maxwell's equations; radiation of electromagnetic waves. Boundary conditions; the propagation phenomena of reflection, refraction, interference, and diffraction. Wave guides, transmission lines, and radiating systems are introduced. *Prereq: SP431, SM311.*

EE481 & EE482 Electrical Engineering Seminar (1-0-1, 1-0-1). Investigation of an electrical engineering topic compatible with student interest and ability. Each topic must be faculty approved and monitored. Topics of sufficient magnitude may be continued another semester. *Prereq: Approval of Department Chairman.*

EE483 & EE484 Electrical Engineering Seminar (2-0-2, 2-0-2). Same as EE481/EE482 except that a minimum of three hours of discussion is required each week.

EE491 & EE492 Electrical Engineering Research (0-2-1, 0-2-1). A faculty-approved and monitored creative engineering research project in the student's field. At least one conference and two hours of laboratory work are required each week. *Prereq: Approval of Department Chairman.*

EE493 & EE494 Electrical Engineering Research (0-4-2, 0-4-2). Same as EE491/EE492 except that a minimum of four hours of laboratory work is required each week.

EE495 & EE496 Electrical Engineering Research (0-6-3, 0-6-3). Same as EE491/EE492 except that a minimum of six hours of laboratory work is required each week.

Department of Mechanical Engineering

Mechanical Engineering Major

Mechanical Engineering, an ECPD accredited major, is the most diverse of the engineering curricula. A sound background in engineering fundamentals, science, and mathematics is provided, and the range of electives offers concentration in several specialized areas of engineering.

In addition to centralized classrooms, shops, analog and digital computing systems, and other interdisciplinary laboratories, the Department maintains such diverse facilities as a materials science laboratory complex, dynamics and physical systems laboratory, solid mechanics laboratory complex, and a thermodynamics and fluid dynamics laboratory. A Bachelor of Science in Mechanical Engineering is awarded.





Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451 and NS452 or NL454 or NPP;

Mathematics: SM201 or SM211 or SM251, SM212, and SM311;

Science: SP211 and SP212 or SP222;

Humanities/Social Sciences: HE300*, FE210 plus three approved electives;

Language: none;

Special: EM213, EM216, EM311, EM312, EM317, EE331, EE332 and ES410;

Major: EN201, EM271, EM411, EM471, EM472 plus five approved electives.

* Taken during second class summer

Mechanical Engineering Courses

EM213 Materials Science for Engineers (3-2-4).

A first course in strength of materials and engineering materials including metals, ceramics, and plastics. Structure and properties of materials, their use in engineering structures, and their mode of failure are covered. *Prereq: 4/C chemistry.*

EM216 Dynamics and Statics (3-2-4). An introductory course in vectorial mechanics with major emphasis on dynamics. Topics include force systems, equilibrium, ship stability, kinematics and kinetics of particles and rigid bodies, work-energy and impulse-momentum concepts. *Prereq: SP211; Coreq: SM212.*

EM271 (371) Principles of Design (3-0-3). An introductory course in the methodology of engineering systems design. Lectures, case studies, and individual and team projects are used to emphasize the formulation, analysis, planning, and management of design problems. *Prereq: 3/C standing or permission of instructor.*

EM311 Engineering Thermodynamics (4-0-4). Introductory engineering thermodynamics, energy and the first law, state analysis, energy analysis of thermodynamic systems, entropy and the second law, thermodynamics of state, analysis of various thermodynamic systems, nonreacting mixtures. *Prereq: EM216, SM212.*

EM312 Fluid Dynamics (3-2-4). An introductory course in the dynamics of Newtonian fluids. Topics include fluid properties and characteristics; conservation equations of mass, momentum, and energy; dynamic similitude; mathematical models and experimental studies of ideal and real fluid flows. *Prereq: EM216 and EM311.*

EM317 Strength of Materials (3-0-3). Introductory solid mechanics: load-deflection, stress-strain-time relationships; stress and strain analysis; fracture; fatigue; bending; torsion; buckling. Emphasis is on basic equilibrium, geometric compatibility,

and constitutive relations. *Prereq: EM213 and EM216.*

EM318 Applied Fluid Mechanics (3-0-3). Introductory fluid mechanics; fluid properties; statics and kinematics; conservation of mass, momentum, and energy; Reynolds, Mach and Froude numbers; viscous effects; applications of fluid dynamics to ships and aircraft. *Prereq: EM319 or equivalent.*

EM319 Applied Thermodynamics (3-0-3). Introductory thermodynamics covering the engineering aspects of processes that take place in naval power plants, internal combustion engines, pumps, refrigeration plants, compressors, nozzles and turbines, and heat transfer devices. *Prereq: SM212.*

EM325 Process Dynamics (2-2-3). Process elements such as open tanks, pressure vessels, and heat exchangers are described by mathematical models. Theoretical characteristics are compared with pilot plant performance. Predictive power of the theory is then evaluated in terms of applicability to design. *Prereq: SM212.*

EM326 Process Control (2-2-3). Mathematical models are developed of typical shipboard systems where thermodynamic variables such as temperature and pressure must be controlled. Theoretical performance is compared to performance of pilot plant models of these same systems. *Prereq: SM212.*

EM327 Essentials of Fluid Dynamics (3-0-3). An introductory course in fluid dynamics with emphasis on fundamental concepts. The course includes applications in environmental science but leaves other specialized applications to the corequisite Naval Engineering II course. *Prereq: SM212.*

EM328 Thermodynamics (3-0-3). An introductory course which covers basic equilibrium laws, principles, concepts, physical properties, and equations of state. Applications related to energy con-

version, environmental control, and ecological problems are discussed. *Prereq:* SM212.

EM332 Experimental Stress Analysis (2-2-3). Modern methods of experimental stress analysis are studied in the classroom and laboratory. Theoretical considerations of combined stresses are compared with experimental methods. Electrical-resistance strain gage, photoelasticity, and brittle-coating techniques are studied in detail and extensively examined in the laboratory. *Prereq:* EM317.

EM353 Physical Metallurgy (3-0-3). Principles of physical metallurgy, including atomic structure, crystal systems, imperfection in crystal structures, liquid and solid phases of metals, phase transformations, and solid state reactions. *Prereq:* EM213.

EM354 Mechanical Behavior of Materials (3-0-3). Treatment of the mechanical properties and behavior of materials. Elastic, plastic, viscous, and viscoelastic behavior are treated, as well as modes of failure, including brittle and ductile fracture. *Prereq:* EM213, EM317.

EM411 Heat Transfer (3-0-3). Computer aided analysis of transient and steady state conduction, laminar and turbulent convection, and thermal radiation. Topics include boundary layer theory, empirical correlations, heat exchangers, analytical methods, and numerical techniques. *Prereq:* EM311; *Coreq:* EM312 or EA311.

EM423 Mechanical Vibrations (3-0-3). Vibration fundamentals, including free, damped, and forced harmonic vibrations of linear single and multi-degree of freedom systems; transient and non-periodic vibrations; continuous systems; and random vibration analysis. *Prereq:* EM317, SM311.

EM432 Computer Methods in Structural Mechanics (3-0-3). Structural design and analysis; matrix formulation employing flexibility and stiffness methods of analysis, computer languages, and techniques in structural design. *Prereq:* EM317.

EM434 Advanced Mechanics of Solids (3-0-3). Topics include theories of elasticity and plasticity; stress and strain as tensors; compatibility and constitutive relationships; Airy stress function; energy methods; stability; yield functions; behavior of time dependent materials; limit theorems of plasticity; plastic design. *Prereq:* EM317, SM311.

EM435 Continuum Mechanics I (3-0-3). Introductory treatment of solids, liquids, and gases from a unifying viewpoint; cartesian tensors, kinematics; Lagrangian and Eulerian descriptions; entropy and the Clausius-Duhem inequality; transport phenom-

ena; and conservation laws. *Prereq:* EM312, EM317, SM311.

EM436 Continuum Mechanics II (3-0-3). A continuation of Continuum Mechanics I with emphasis on theoretical and experimental methods for constitutive modeling; perfect Newtonian and Stokesian fluids; elastic, plastic, viscoelastic, and viscoplastic materials. *Prereq:* EM435.

EM442 Computer Methods in Engineering (3-0-3). Computer methods for analysis of initial and boundary value problems. Computer techniques for generation and manipulation of graphical output. Mathematical theory of computer graphics and curve and surface description. *Prereq:* Permission of instructor.

EM443 Direct Energy Conversion (3-0-3). Introduction to irreversible thermodynamics, quantum physics, and transport phenomena and their application to DEC device operations; thermo-electric, photovoltaic, thermionic, fuel cells, magneto hydrodynamic, and other modes of direct energy conversion. *Prereq:* EM311, EE332 or equivalent.

EM444 Turbomachinery (3-0-3). Analysis of energy transfer in turbomachines; centrifugal pumps on compressors; turbines; boundary layers in cascades; performance of turbo-machinery; calculation of loss coefficients; and mechanisms of cavitation damage. *Prereq:* EM312 or equivalent.

EM446 Environmental Systems Engineering (3-0-3). Principles of thermodynamics, heat transfer and fluid mechanics as applied to the creation and control of thermal environments. Cycles and equipment for heating, cooling, and humidity control. *Prereq or Coreq:* EM311 or EM319 or EM328 or SP224.

EM462 Hydrodynamics (3-0-3). Solution of two- and three-dimensional inviscid incompressible flows by exact and approximate methods, including analogies. Adaptation of non-viscous flow theory to the analysis of real fluid flow. *Prereq:* EM312, SM312 or SM280.

EM471 Mechanical Engineering Laboratory (1-4-3). A course in the methodology of engineering experimentation and experimental design. Topics include experimental error and uncertainty, dimensional analysis, instrumentation, experimental design, data analysis, and individual experimental projects. *Prereq:* Engineering major with 1/C standing or permission of instructor.

EM472 Mechanical Design (2-2-3). Detailed study of the engineering design process through lectures and case studies, followed by student teams engaging in authentic design projects of their own choos-





ing, culminating with formal reports and presentations. *Prereq:* Engineering major with 1/C standing or permission of instructor.

EM481 Advanced Topic in Mechanical Engineering (3-0-3). A topic selected from the following disciplines: energy conversion and thermal science, structural mechanics, fluid dynamics, material science, design, control systems, computer science, and optics engineering. *Prereq:* Approval of instructor and Department Chairman.

EM483 Seminar in Mechanical Engineering (1-0-1). Group discussion seminar designed to give the

student an opportunity to discuss topics at the forefront of development. Material will be taken from technical government reports and from texts and scientific journals. *Prereq:* Approval of instructor and Department Chairman.

EM491-492; EM493-494; EM495-496 Mechanical Engineering Research, Design, or Construction Project (0-2-1, 0-4-2, 0-6-3). A creative engineering research, design, or construction project selected by the student, entailing a minimum of two, four, or six hours of laboratory, shop, or design work each week. *Prereq:* Approval of the Department Chairman.

General Engineering Major

The General Engineering major provides the student with a basic technical education in mathematics, science, engineering fundamentals, and naval professional engineering subjects. It is intended to provide an adequate background for future naval technical training and education. Midshipmen completing the General Engineering major receive a non-designated Bachelor of Science degree. The major is not accredited by ECPD.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM201 or SM211 or SM251 and SM212;

Science: SP201 or SP211 and SP202 or SP212 or SP222;

Humanities/Social Sciences: HE300* and four approved electives;

Language: none;

Special: EM213, EM216, EM317 plus three approved engineering, mathematics, or science electives;

Major: EN201, EM272, EM327, EM328, EE313 plus two approved electives.

* Taken during second class summer

Department of Naval Systems Engineering

Marine Engineering Major

This ECPD accredited major is concerned with the analysis and design of propulsion power plant systems. It is nuclear engineering oriented. Students completing this program can expect to continue their education in the Navy's Nuclear Power Program or in nuclear or marine engineering graduate studies.

A broad background in engineering fundamentals is provided students, who then apply

these principles in their studies of conventional steam and nuclear power plants, gas turbines, and such advanced power systems as fuel cells and thermoelectric units.

A course covering the principles of naval engineering systems develops an understanding of the principles of ship design and construction and introduces students to the problems of analyzing and designing systems for use in the ocean environment. Studies in modern physics prepare them for the reactor physics and reactor engineering courses. Studies in heat transfer—so essential in the study of modern propulsion power systems—follow. Knowledge gained from these studies is then used in the analysis of marine propulsion plants and in group designs of future propulsion systems.

Past designs by students have included the concept design of a propulsion plant for a low water plane catamaran, preliminary design of a submarine waste disposal system, and the concept design of an offshore nuclear power plant. A Bachelor of Science in Marine Engineering is awarded.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: EM213, EM216, EM311, EM312, EM317, EE331, EE332, ES410;

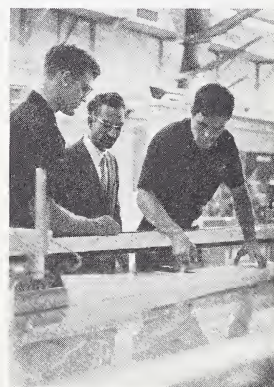
Major: SP301, EN201, EN341, EN360, EN362, EN377, EN460, EN463, EN466, EM411, plus two approved electives.

* Taken during second class summer

Naval Architecture Major

Naval architecture, an ECPD accredited major, unlike most engineering disciplines unified by the nature of the phenomena involved, originally came into being as a discipline because of a single end-product, the ship. A special combination of knowledge and experience is needed to develop, design, and build this single product. Variety exists not only in the kinds of work (design, research, cost estimation, management, etc.), but also in the types of craft involved—from sail boats to aircraft carriers, from hydrofoil boats to catamarans, from submarines to air cushion vehicles.

The naval architect uses both art and science in designing ships. Armed with imagination and experience, he converts the owner's functional requirements into a suitable cost-effective design. He analyzes and selects the best dimensions and hull form; he calculates the power requirements and estimates the weights of the principal components. He designs and analyzes the hull structure and decides on the location of military subsystems, machinery spaces, accommodations, and stores. Additionally, the ship must be divided into watertight compartments so that, if damaged, the chances of survival are maximum. Weighing and compromising all such conflicting needs in the design of the ship are the creative and challenging responsibilities of the naval architect.



Naval architecture at the Naval Academy treats most of the preceding facets through a fully integrated program of classroom sessions, hands-on laboratory work, field trips, and the latest in computer-aided design and analysis techniques. A Bachelor of Science in Naval Architecture is awarded upon successful completion of the program.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: EM213, EM216, EM311, EM312, EM317, EE331, EE332, ES410;

Major: EN201, EN351, EN352, EN341, EN360, EN377, EN453, EN455, EN460, plus two approved electives.

* Taken during second class summer



Ocean Engineering Major

Ocean Engineering, an ECPD accredited major, is the key to the last frontier on earth—the deep ocean. This is an interdisciplinary field involving the application of engineering principles to hardware systems in the ocean environment. The curriculum stresses fundamentals of mathematics, physics, mechanical engineering, electrical engineering, and oceanography, followed by the application of these fundamentals in ocean engineering courses which include analysis of ocean materials, power systems, acoustics, wave mechanics, life-support systems, and a wide variety of ocean vehicles and structures.

Laboratory experiments are conducted in an 85-foot towing tank equipped with a pneumatic wave-maker and instrumented with sophisticated sensors and on-line data acquisition and analysis equipment. The Naval Academy's computer systems are used in solving design problems. Sediment laboratory and environmental chamber facilities are also available. Midshipmen have designed and are building an undersea habitat which will be used as a field laboratory. A Bachelor of Science in Ocean Engineering is awarded upon successful completion of the program.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451 and NS452 or NL454 or NPP;

Mathematics: SM211, SM212;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: EM213, EM216, EM311, EM312, EM317, EE331, EE332, ES410;

Major: SO221, SP411, EN201, EN341, EN360, EN375, EN377, EN460, EN473, EN477 plus two approved electives.

* Taken during second class summer

Naval Systems Engineering Courses

EN200 Naval Engineering I (3-2-4). An introduction to ship systems, including basic methods of ship procurement, construction, and powerplant selection. Principles of ship stability and operability as related to preventive and corrective damage control. *Prereq:* EW102, Physics I; 3/C cruise.

EN201 Engineering Design Graphics (0-2-1). An introduction to engineering graphical methods and disciplines with emphasis on special visualization and design. Topics include orthographic projection, axonometric drawing, and descriptive geometry.

EN251 Advanced Engineering Graphics (3-0-3). An advanced course in engineering graphical methods and disciplines with emphasis on problem solving and design. Coverage includes elements of design, orthographic projection, axonometric and perspective drawing, and descriptive drawing. *Prereq:* EN201 or permission.

EN301 Naval Engineering II (3-2-4). A study of naval engineering systems, including the principles of energy conversion; the basic operation of steam, gas turbine, nuclear, and internal combustion engine powerplants; and shipboard engineering department operations. *Prereq:* EW102, SP211, third class cruise.

EN341 Introduction to Naval Systems Engineering (3-0-3). This course is designed to show how the basic principles of engineering can be applied in an ocean environment. A systems approach is taken such that technology is discussed in terms of concept-project-mission relationships. The specific topics include a broad overview of engineering considerations for surface ships, submarines, deep submergence vehicles, materials, power, environmental measurements, diver technology, seafloor construction, test facilities, and ocean resource utilization. *Prereq:* EM213, or permission.

EN351 Ship Hydrostatics (3-0-3). Transverse and longitudinal stability of both surface ships and submarines are studied. Flooding and stability of ships in the damaged condition are covered. Digital computers are used to solve hydrostatic problems. *Prereq:* EN341

EN352 Resistance and Propulsion (2-2-3). Topics: dimensional analysis, similitude, wave and viscous resistance of ships, ship-model testing techniques, full-scale performance prediction, momentum theory of propulsive devices, and propeller vibrations and design. *Prereq:* EN351.

EN360 Marine Power Plants (1-2-2). This is a case study type of course in which the students use theoretical thermodynamics and fluid mechanics in order to analyze a typical ship's

power plant. Steam and gas turbine plants are covered. Energy from conventional means is studied and energy from nuclear sources is discussed. In the laboratory the student receives a hands-on relationship with steam and gas turbine plants and works out the performance characteristics of the various components. *Prereq:* EM311; EM312 concurrent, EN341.

EN362 Reactor Physics I (3-0-3). An introductory course in nuclear reactor theory covering fission, neutron diffusion, material and geometric buckling, and the critical equation. Bare and reflected homogeneous reactors are studied. *Prereq:* SM212 or equivalent.

EN373 Life Support Systems (3-0-3). The physiological and psychological aspects of "man in the sea" are presented with their related engineering requirements. Topics include hyperbaric physiology, saturation diving, life support equipment, deep dive systems, diving operations and hazards. *Prereq:* Permission and SP202 or SP212.

EN374 (372) Seafloor Mechanics (2-2-3). A study of the basic principles of soil mechanics as applied to marine sediments. Topics include shear strength, consolidation, and slope stability. *Prereq:* EN341 or permission.

EN375 Ocean Engineering Materials and Structures (2-2-3). Material and structural design considerations of fixed ocean structures, mooring systems, and undersea vehicles are analyzed. Laboratory projects include fouling and corrosion studies, and high pressure testing. *Prereq:* EM317, EN341.

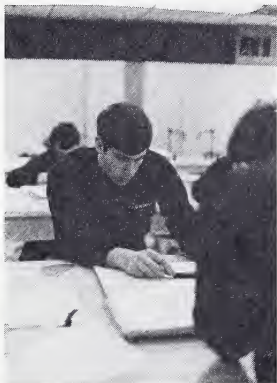
EN376 Coastal Engineering (2-2-3). A study of littoral drift and wave action on coastal structures. Topics include littoral drift past a river estuary, breakwaters, jetties, groins, and harbor design. *Prereq:* EM317, EN341.

EN377 Seminar in Ocean Systems Engineering (1-0-0). Invited lectures with major responsibilities in the areas of ocean systems engineering. Topics include design and construction of marine vehicles, ocean structures, energy sources needed in the ocean environment, and environmental pollution. *Prereq:* EN341 or permission.

EN413 Seakeeping and Maneuvering (2-2-3). Topics: ship steering, maneuvering, motion, and seakeeping. The basic equations of motion for a maneuvering ship and for ship motions in a seaway are developed, and various methods of solution are discussed. *Prereq:* EN352.

EN455 Ship Structure (3-0-3). Topics include longitudinal and transverse strength of the hull girder, bending moments in a seaway, plate theory,





development of the ship's structural design, submarine pressure hull design, and shipbuilding materials. *Prereq:* EM317, EN351.

EN456 Computer Applications in Naval Architecture (3-0-3). An introduction to computer-aided ship design is presented. Topics include numerical procedures applied to form, stability, resistance, propulsion, motion, maneuvering, and strength. *Prereq:* Permission.

EN457 Hydrofoil and Propeller Theory (3-0-3). The analysis and design of hydrofoils and marine propellers are presented. Lifting line and lifting surface theories are applied to naval devices. Design and towing tank work supplements recitations. *Prereq:* EN352 or permission.

EN458 Advanced Marine Vehicles (2-2-3). Modern watercraft discussed: planing boats, hydrofoil craft, ground-effect machines, and combatant and research submersibles. Analysis and design features are investigated experimentally in the towing tank when appropriate. *Prereq:* EN453.

EN460 Ocean Systems Engineering Design (1-4-3). Conceptual design of a marine system is accomplished by midshipmen teams. The realistic project format followed will involve proposal writing, project manager designation, progress reports, and preparation and design review by experts. *Prereq:* 1/C standing, with a technical or management major.

EN463 Reactor Physics II (2-2-3). The topics covered include neutron generation times, reactor period, delayed neutrons, negative temperature coefficient, xenon poisoning, control rod theory, shielding and, finally, a reactor kinetics case problem. *Prereq:* EN362.

EN464 Reactor Control Analysis (3-0-3). Reactor kinetics control theory and the feedback effects. Laplace transforms are used in the analysis of the input/output for a reactor. *Prereq:* EN463.

EN466 Analysis of Marine Propulsion Equipment (2-2-3). A preliminary design of naval powerplants. Through use of a case problem, the student learns to synthesize a large number of machinery elements into a functioning system to give the desired performance. *Prereq:* EM312, EN341.

EN467 Marine Propulsion Plant Design and Per-

formance Laboratory (1-4-3). Various propulsion systems and components are tested for transient and steady-state performance. Topics include gas turbines, conventional steam, and nuclear (steam) propulsion plants. *Prereq:* EN466.

EN468 Nuclear Energy Conversion (3-0-3). Principles of the conversion of nuclear energy into useful power are covered. Various types of nuclear power plants, their design, cycles, load following characteristics, etc. are studied. Direct nuclear energy conversion systems are also studied. *Prereq:* EN362.

EN472 Design of Submersibles and Support Vessels (3-0-3). The submersible and its support vessel are treated as a system. Design considerations include hull types, failure modes, energy sources, propulsion, stability, maneuverability, instrumentation, launching, and retrieval. *Prereq:* EN341, EM317, EM312.

EN473 Ocean Engineering Mechanics (2-2-3). Effects of gravity waves on surfaced and submerged floating bodies and on moored and fixed bodies. Measurement techniques discussed include measurements of wave height, wave-induced forces, and motions in waves. *Prereq:* EM312, EN341.

EN477 Undersea Power Systems (3-0-3). The principles of design of undersea power systems are presented. Topics include batteries, fuel cells, chemical-dynamic systems, radioisotopes and nuclear reactor systems, and cable systems. *Prereq:* EN341, EE332, EM312.

EN481 Advanced Topic in Naval Engineering (3-0-3). Selected topic of theoretical nature in naval architecture or marine or ocean engineering which is not covered by regular courses of the curriculum. Designed to emphasize the application of advanced mathematical methods. *Prereq:* Approval of instructor and Department Chairman.

EN491-492, EN493-494, EN495-496 Naval Engineering Research, Design or Construction Project (0-2-1, 0-4-2, or 0-6-3). A creative engineering research, design, or construction project in the student's field of interest, entailing a minimum of two, four, or six hours of laboratory, shop, or design work each week. *Prereq:* Approval of Department Chairman.

Department of Weapons and Systems Engineering

Systems Engineering Major

This interdisciplinary major is accredited by ECPD and encompasses such diverse fields as electronics, fluids, linear physical systems, automatic control systems, digital computer technology, and system simulation using analog, digital, and hybrid computing systems. An overall understanding of the analysis and design of complete engineering systems, including the various interfaces present, is the primary goal. A Bachelor of Science in Systems Engineering is awarded.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451 and NS452 or NL454 or NPP;

Mathematics: SM211, SM212, SM239;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and FE210 plus three electives;

Language: none;

Special: EM213, EM216, ES305, ES309, EM318, EM319, EE331, EE332;

Major: ES201, ES303, ES306, ES402, plus six approved electives.

* Taken during second class summer



Systems Engineering Courses

EW102 Introduction to Naval Engineering and Weapons Systems (3-0-3). An introductory course for fourth class midshipmen stressing general principles of operation of shipboard engineering plants and weapons systems.

ES201 Introduction to Systems Engineering (2-2-3). Illustrations of systems engineering. The selection of mathematical models as real system approximations. Feedback systems. Digital and analog computers. *Prereq: SI101.*

EW301 Shipboard Weaponing (3-0-3). A study of shipboard gun, missile, and ASW systems and supporting equipments. *Prereq: EW102, SP201, 3/C At-sea Training.*

ES303 Systems Simulation I (2-2-3). Principles of simulation of linear physical systems are applied using analog and digital computers. *Prereq: ES201; Coreq: ES305.*

ES305 Systems Engineering Analysis I (3-0-3). A study of dynamic behavior of physical systems through the solution of differential equation model using transform techniques. *Prereq: ES201; Coreq: ES303.*

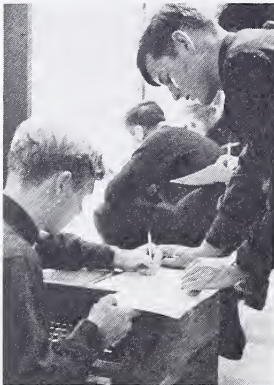
ES306 Advanced Systems Simulation (2-2-3). Simulation of system dynamic response. Continued usage of analog and digital computers as aids to analysis and design, with an introduction to hybrid simulation. *Prereq: ES303, ES305.*

ES309 Systems Engineering Analysis II (3-0-3). Analysis and design of linear automatic control systems. *Prereq: ES303, ES305.*

ES310 Digital Computer Applications (2-2-3). A study of digital computer utilization in system simulation using modeling techniques, decision and game theory. *Prereq: SI102.*

ES311 Systems Engineering Laboratory (0-4-2). The application of systems engineering techniques to laboratory hardware while analyzing and synthesizing actual closed loop systems. *Prereq: ES303, ES305; Coreq: ES309.*

ES400 Weapons Systems Engineering (3-2-4). A study of the engineering principles governing the functioning of the various components (detection, control, delivery, and destruction) of naval weapons systems. *Prereq: EW301, 1/C At-sea Training, EN301, EE312.*



ES402 Systems Engineering Design (2-4-4). Introduction to the macro-techniques of engineering design including performance, reliability, management control, redundancy, man-machine systems, and testing techniques. *Prereq: ES306, ES309.*

ES406 Information Systems Analysis (3-0-3). Classical information and coding theory. Evaluation of discrete information systems such as computer systems, communication systems, and radars. *Prereq: ES306, ES309.*

ES407 Hybrid Computer Simulation (1-4-3). Introduction to hybrid computation, hardware and software consideration of hybrid interface, solution of one and two point boundary value problems, and multiparameter optimization using hybrid techniques. *Prereq: ES306 or consent of instructor.*

ES408 Digital Technology (2-2-3). An introduction to logical organization and internal functioning of digital devices applying sequential machine theory, machine language, Boolean algebra and switching circuits. *Prereq: SI102.*

ES409 Modern Control Systems (3-0-3). An introduction to state space analysis of control systems furnishing a background necessary for studying modern control theory. *Prereq: ES306, ES309.*

ES410 Control Systems and Their Application to Weapons (3-2-4). Linear control systems for en-

gineering majors, using analytical, graphical, and computer techniques. *Prereq: I/C standing in an engineering major.*

ES412 Advanced Systems Analysis (3-0-3). Conventional and modern analysis of continuous-time, discrete-time, and hybrid linear systems; signal analysis. *Prereq: ES306, ES309.*

ES414 Sampled Data and Digital Control Systems (2-2-3). Response of control systems to discrete and sampled-continuous inputs using the Z-transformation techniques. *Prereq: ES306, ES309.*

ES415 Non-Linear Control Systems (2-2-3). Analysis and design of control systems having non-linear components. *Prereq: ES306, ES309.*

ES491 & ES492 Systems Engineering Research (0-2-1, 0-2-1). A creative, technical, independent study/project in the systems engineering field. *Prereq: Approval of the Department Chairman.*

ES493 & ES494 Systems Engineering Research (0-4-2, 0-4-2). Same as ES491/ES492 except that a minimum of four hours of laboratory work is required each week.

ES495 & ES496 Systems Engineering Research (0-6-3, 0-6-3). Same as ES491/ES492 except that a minimum of six hours of laboratory work is required each week.





Division of Mathematics and Science

Department of Mathematics

Department of Chemistry

Department of Environmental Sciences

Department of Physics

Department of Computer Science



Department of Mathematics

Mathematics Major

The major in Mathematics provides students with a background which will support graduate study in scientific, technical, and professional fields. In addition, the study sequence of courses leading to the major will prepare the student for graduate study in theoretical or applied mathematics.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: (See major);

Science: SP211, SP212, and one physics elective;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: none;

Major: SM201 or SM211 or SM251, SM212, SM261, SM262, SM321, SM322, SM323, three mathematics electives of which two must be of the 400-level, one major elective.

* Taken during second class summer

Physical Science Major

The Physical Science major is an inter-disciplinary science major and involves the study of chemistry, physics, and the air-ocean environment. It provides the student with a broad background in the physical applications of mathematics and science.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM201 or SM211, SM212

Science: SP201 or SP211, SP202 or SP212;

Humanities/Social Sciences: HE300* and four elective courses;

Language: none;

Special: none;

Major: SO221, SO241, SP301, SP411; engineering elective, plus two electives from math/computer science; two electives from science/engineering and two from science/mathematics/engineering.

* Taken during second class summer

Mathematics Courses

SM005 Pre-Calculus Mathematics (4-0-4). Basic review of algebraic and arithmetic operations, analysis of functions and their graphs, trigonometry. Open only to those students selected by the Mathematics Department. This course does not fulfill any of the mathematics requirements of any major.

SM101 & SM102 Introduction to Analytic Geometry and Calculus I & II (4-0-4, 4-0-4). Course content similar to SM111 and SM112. For those not qualified to enroll in SM111.

SM101T Introduction to Analytic Geometry and Calculus I with Trigonometry (5-0-5). Same as SM101 plus one semester hour of trigonometry.

SM111 & SM112 Calculus and Analytic Geometry I & II (4-0-4, 4-0-4). Plane analytic geometry; differential and integral calculus of one real variable.

SM111T Calculus and Analytic Geometry I with Trigonometry (5-0-5). Same as SM111 plus one semester hour of trigonometry.

SM161 & SM162 Calculus with Computers I & II (5-0-5, 5-0-5). Programming using BASIC, algorithmic development of the integral and differential calculus of one real variable. *Prereq:* Permission of the Department Chairman.

SM201 Analytic Geometry and Calculus III (4-0-4). Course content same as SM211 plus one semester hour of selected topics of one real variable. Designed to strengthen the background of students completing SM101 & SM102. *Prereq:* SM102.

SM211 Calculus and Analytic Geometry III (3-0-3). Solid analytic geometry, series, partial differentiation, and multiple integration. *Prereq:* SM112 or SM162.

SM212 Differential Equations (4-0-4). Linear and simultaneous differential equations; solution by Laplace transform and series; partial differential equations and Fourier series. *Prereq:* SM201 or SM211 or SM251.

SM219 Probability and Statistics (3-0-3). Nature of statistical methods, description of data, prob-

ability, distributions, sampling, estimation, testing hypothesis, correlation and regression. This course is intended primarily for Group III majors who take only two semesters of calculus. The appropriate enrollment for others is SM239.

SM229 Linear Algebra and Probability and Statistics (4-0-4). Linear algebra: matrices, linear equations, vector spaces, linear transformations, characteristic roots. Probability and statistics: probability, finite sample spaces, conditional probability, random variable, distributions, and moment-generating functions. *Coreq:* SM201 or SM211 or SM251.

SM239 Probability and Statistics I (3-0-3). Set theory, probability, distribution functions, standard distributions, joint distributions, sampling and statistics. *Coreq:* SM201 or SM211 or SM251.

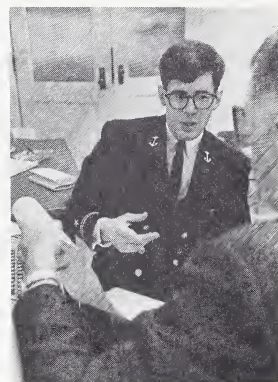
SM251 Calculus with Computers III (4-0-4). Course content includes and extends that of SM211 with extensive computer applications. *Prereq:* SM162.

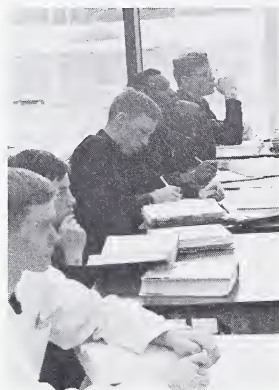
SM259 Mathematical Logic (3-0-3). Axiomatic systems, formal logic, first-order predicate calculus, quantifiers, deduction theory, recursive functions, axiomatic set theory, Boolean algebra, metamathematics, and intuitionism. *Prereq:* SM102 or SM112 or SM162.

SM261 Matrix Theory (3-0-3). Matrices, transformations, bilinear and quadratic forms, linear equations, vector spaces, and characteristic matrix. *Prereq:* SM102 or SM112 or SM162.

SM262 Modern Algebra (3-0-3). Sets, rings, fields, rational numbers, groups, and algebra of matrices. *Prereq:* SM102 or SM112 or SM162.

SM264 Introduction to Numerical Analysis (3-0-3). Finite differences and applications; algebraic and transcendental equations; computation with series and integrals; numerical integration; numerical solutions of differential equations; systems of linear equations; difference equations. *Prereq:* SM102 or SM112 or SM162; SI102 or equivalent.





SM269 Probability and Statistics II (3-0-3). Estimation, confidence intervals, tests of hypothesis, Bayesian methods, least squares, regression. *Prereq:* SM239.

SM270 Introduction to Mathematical Economics (3-0-3). Equilibrium analysis, models, theory of the multiplier, acceleration principle, optimization, and linear differential and difference equations. *Prereq:* SM229 or SM261.

SM271 Linear Programming (3-0-3). Simplex and dual simplex methods, minimax theorem, integer and parametric programming, transportation problems, and game theory. *Prereq:* SM261 and SI102 or equivalent.

SM280 Mathematics for Engineers and Physicists (3-0-3). Topics from vector analysis and complex variables. *Prereq:* SM212.

SM281 Vector Analysis (3-0-3). Vectors, vector calculus and fields, line and surface integrals, Stokes, and Gauss' theorems. *Prereq:* SM201 or SM211 or SM251.

SM311 Engineering Mathematics I (3-0-3). Fourier series and integral. Frobenius method, Bessel function, Sturm-Liouville theorem, and vector analysis. *Prereq:* SM212.

SM312 Engineering Mathematics II (3-0-3). Laplace transforms and selected topics from complex variables. *Prereq:* SM212.

SM315 Introduction to Partial Differential Equation, (3-0-3). Linear equations, Cauchy problems, Laplace and Poisson equations, boundary value problems, heat equations, Sturm-Liouville problems, and orthonormal expansions. *Prereq:* SM212.

SM321 Elements of Analysis I (3-0-3). Sets, functions, real numbers, limits, and Bolzano-Weierstrass and Heine-Borel theorems. *Prereq:* SM261.

SM322 Elements of Analysis II (4-0-4). Continuity and differentiability (single variable functions), metric spaces, sets, sequences, completeness, compactness, connectedness, and continuity in metric spaces. *Prereq:* SM321.

SM323 Elements of Analysis III (4-0-4). Important integrals, power series, mappings, implicit and inverse functions, derivatives of functions of several variables, and multiple integrals. *Prereq:* SM322.

SM371 Principles of Analysis I (4-0-4). Set-theory, real numbers, metric spaces, sequences, and differentiation. *Prereq:* SM261 and SM262.

SM372 Principles of Analysis II (4-0-4). Important integrals, power series, mappings, implicit and inverse functions, differentiation and multiple integrals, Fubini theorem, and change of variables. *Prereq:* SM371.

SM400 Calculus/Differential Equations for Nuclear Power Selectees (4-0-4). Partial differentiation, multiple integration, linear and simultaneous differential equations, topics from vector analysis. Enrollment restricted to selectees for nuclear power who have not completed SM212. Selectees who have completed Calculus III with a grade of A or B may enroll in SM212 instead of SM400.

SM411 Introduction to Complex Variables (3-0-3). Number field, Cauchy-Riemann differential equations, analytic functions, series, singularities, residues, conformal mapping, and continuation. *Prereq:* SM371 or *Coreq:* SM322.

SM425 Advanced Numerical Analysis (3-0-3). Series, truncation error, iterative methods, matrices, characteristic values, quadratures and difference equations. *Prereq:* SM229 or SM261; SM311 or SM315 or SM321; SI102 or equivalent.

SM426 Numerical Methods for Differential Equations (3-0-3). Existence and uniqueness of solutions, finite difference approximations for derivatives, one-step and multi-step methods, estimation of error, stability, boundary value and eigenvalue problems, partial differential equations. *Prereq:* SM311 or SM315 or SM321; SI102 or equivalent.

SM432 Operational Methods (3-0-3). Laplace and Fourier transforms applied to problems of science and engineering involving ordinary and partial differential equations. *Prereq:* SM411 and permission of instructor.

SM450 Special Topics (3-0-3). An in-depth study of a particular branch of mathematics. *Prereq:* permission of instructor.

SM461 Linear Algebra (3-0-3). Vector spaces, linear transformations, Jordan canonical form, inner product spaces. *Prereq:* SM261; SM371 or SM321; and permission of instructor.

SM462 Algebraic Structures (3-0-3). Groups, rings, fields, Galois theory. *Prereq:* SM262; *Coreq:* SM371 or SM311; permission of instructor.

SM464 Topology (3-0-3). Sets, functions, metric and topological spaces, and Banach spaces. *Prereq:* SM262; *Coreq:* SM371 or SM322, and permission of instructor.

SM465 Advanced Differential Equations I (3-0-3). Existence, uniqueness and oscillation theorems, stability, topological methods. *Prereq:* SM371 or SM322; *Coreq:* SM372 or SM323, and permission of instructor.

SM466 Advanced Differential Equations II (3-0-3). Autonomous systems, stability, singular points, Sturm-Liouville systems, eigenfunctions. *Prereq:* SM465 and permission of instructor.

SM468 Measure and Integration (3-0-3). Construction, properties and extensions of measures, Lebesgue-Stieltjes measure, integrals, Fubini and Nikodym theorems, Daniell integral, relation to probability theory. *Prereq:* SM372 or SM323, and permission of instructor.

SM481 Mathematics Seminar (3-0-3). Seminar in a specified field of mathematics. *Prereq:* Approval of Department Chairman.

SM482 Mathematics Seminar (3-0-3). Similar to SM481.

SM491 Mathematics Research Project (3-0-3). A research project in a field of interest. *Prereq:* Approval of Department Chairman.

SM492 Mathematics Research Project (3-0-3). Continuation of SM491.

Department of Chemistry

Chemistry Major

Chemistry, an experimental science, is the most laboratory-oriented program offered at the Naval Academy. The undergraduate laboratory facilities of Michelson Hall are unexcelled. The serious student of chemistry has ample opportunity to experiment and observe as he pursues the scientific method. Laboratory equipment includes single-pan balances, gas chromatographs, mass spectrometer, X-ray diffraction, and nuclear magnetic resonance spectrometers.

Any naval officer will profit from a good knowledge of chemistry. A background in the fundamental principles of chemistry and modern experimental techniques is highly valuable for naval officers working in many technical subspecialties, such as oceanspace research, life sciences and support systems, propellants, and many others.

The chemistry major is approved by the American Chemical Society.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: two free electives;

Major: SC201, SC202, SC301, SC321, SC302, SC401, SC322, SC301L, SC302L, and one non-specified chemistry elective.

* Taken during second class summer



Chemistry Courses

SC103 & SC104 Elements of Chemistry (3-2-4, 3-2-4). A presentation of inorganic, organic, and physical chemistry for the student with a limited chemistry, mathematics and science background.

SC105 & SC106 General Chemistry (3-2-4, 3-2-4). A fundamental course that stresses the naval ap-

plications of chemistry. The course covers the areas of inorganic, organic, and physical chemistry in classroom and laboratory sessions. *Prereq:* One year of high school chemistry.

SC113 & SC114 Principles of Chemistry (3-2-4, 3-2-4). A rigorous course designed for those stu-



dents who exhibit above average aptitude and ability in chemistry. *Prereq:* One year of high school chemistry.

SC201 & SC202 Organic Chemistry (3-6-5, 3-6-5). The chemistry of carbon compounds, both aliphatic and aromatic. Specialized areas of chemistry examined include drugs, high-energy fuels, plastics, explosives, petroleum, and others. *Prereq:* SC114, SC106 or SC104.

SC301 & SC302 Physical Chemistry (3-0-3, 3-0-3). An introduction to the physical states of matter, kinetic theory of gases and liquids, thermodynamics, phase equilibria, properties of solutions, atomic and molecular structure. *Prereq:* SM211, SP212.

SC301L & SC302L Physical Chemistry Laboratory (0-3-1, 0-3-1). A comprehensive, sophisticated laboratory course designed to give practical laboratory experience in the areas covered in courses SC301 and SC302. *Prereq:* SC321, SC302.

SC321 Quantitative Analysis (2-6-4). A study of volumetric, gravimetric, and modern optical and electrical methods of analysis. Theory and laboratory procedures and techniques are stressed. *Prereq:* SC114 or SC106.

SC322 Inorganic Chemistry I (3-0-3). A study of fundamental concepts. Topics include atomic structure, chemical bonding, complex ions, and co-ordination chemistry. *Prereq:* SC302.

SC332 Biochemistry (3-0-3). The biological chemistry of the human body is discussed, including both normal and abnormal aspects. Metabolism, nutrition, vitamins, and hormones are included. *Prereq:* SC201.

SC401 Instrumental Methods of Analysis (2-6-4). The theory and applications of modern instrumental methods of analysis are stressed. A wide array of sophisticated instruments is available for student use. *Prereq:* SC302, SC321.

SC402 Advanced Organic Chemistry (2-6-4). Integrates current theory with modern experimental techniques. Identification of organic compounds by chemical and instrumental means. *Prereq:* SC202, SC401.

SC412 Inorganic Chemistry II (3-0-3). An advanced treatment of the subject which continues from SC322. Selected topics from the current literature of chemistry get major consideration. *Prereq:* SC322.

SC414 Reaction Kinetics (3-0-3). An examination of the physical and mathematical bases of reaction rate studies. Particular attention is paid to catalytic effects in chemistry. *Prereq:* SC302.

SC416 Electrochemistry (3-0-3). A study of electrolytic conductance, ion migration, electrode potentials, and the deposition and corrosion of metals in electrolyte systems. *Prereq:* SC302.

SC491 & SC492 Chemistry Special Laboratory Project (0-2-1). More limited in scope than SC493 and SC494. *Prereq:* Approval of Department Chairman.

SC493 & SC494 Chemistry Special Laboratory Project (0-4-2). A creative project, monitored by a faculty member. An advisor's conference weekly. *Prereq:* Approval of Department Chairman.

SC495 & SC496 Chemistry Research Project (0-6-3). A major research project to be selected by the student. An advisor's conference weekly. *Prereq:* Approval of Department Chairman.

Bioscience Major

The Bioscience major is intended for those students who are selected to attend medical school immediately upon graduation from the Naval Academy. Applicants are chosen for entrance to this major by a faculty selection committee and will be restricted to 2 percent of the class. This major will terminate with the class of 1977. It will not be offered to the class of 1978 or subsequent classes.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EW301, EN301, EE311, EE312, NS300*, NS302, NL302, NL451, HH310, and ES400;

Mathematics: SM211 plus one elective;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Major: SB151, SB152, SC201, SC202, SC321, SB302, SB401, SB402, plus two electives from the following: SC301, SC302, SC322, SC332, SC412, SB403, SB404, SB491, SB493, SB495.

* Taken during second class summer

Bioscience Courses

SB151 & SB152 General Biology I & II (3-2-4, 3-2-4). Fundamental principles are introduced. Topics include protoplasm, plant and animal histology, plant and animal metabolism, gametogenesis, and cell division, as well as genetics, ecology, and organic evolution.

SB302 Structural Biology (2-4-4). A detailed study of the structure and function of organs, organ systems, and their interaction in the whole organism. *Prereq: SB152.*

SB401 Cellular Biology (2-4-4). A study of cellular structure, ultrastructure, function, integration, and control. *Prereq: SB302.*

SB402 Developmental Biology (3-2-4). A study of development including fertilization, growth, and differentiation of selected organisms. *Prereq: SB401.*

SB403 Genetic Biology (3-0-3). The physical and chemical basis of heredity is considered from a classical and a molecular approach. *Prereq: SB152.*

SB404 Environmental Biology (3-0-3). A study of the relationships between organisms and between organisms and their environment. The impact of man on environment is considered. *Prereq: SB152.*

SB491 & SB492 Biology Special Laboratory Project (0-2-1). More limited in scope than SB493 and SB494. *Prereq: Approval of Department Chairman.*

SB493 & SB494 Biology Special Laboratory Project (0-4-2). A creative project, monitored by a faculty member. An advisor's conference weekly. *Prereq: Approval of Department Chairman.*

SB495 & SB496 Biology Research Project (0-6-3). A major research project to be selected by the student. An advisor's conference weekly. *Prereq: Approval of Department Chairman.*

Department of Environmental Sciences

Oceanography Major

Oceanography is an inter-disciplinary science major involving the study of physics, chemistry, biology, and geology as they relate to our ocean environment and the effects of that environment on naval operations. It is a laboratory-oriented program with the most modern facilities, including an oceanographic research vessel, a field laboratory, a weather station and radiosonde system for study of the atmosphere, plus a wave tank, tide gauges, marine culture systems, and fully equipped laboratories.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM201 or SM211, SM212 plus one approved elective;

Science: SP211, SP212;

Humanities/Social Sciences: HE300* and four electives;

Language: none;

Special: none;

Major: EM327, EM328, SB151, SG161, SO212, SO241, SO312, SO411 plus three approved electives.

* Taken during second class summer





Oceanography Courses

SO111 Air-Ocean Environment (3-0-3). Emphasizes the impact of the marine environment on naval applications.

SG161 Physical Geology (3-2-4). A study of the solid earth including the composition and properties of rocks and minerals. Development of the landscape by geological processes is emphasized.

SO212 General Oceanography (3-2-4). An introductory study of the ocean. *Prereq:* SB151, SC106 or SC114, SG161, SM201 or SM211, SP211.

SO221 Introduction to Oceanography (3-0-3). Examines those aspects of oceanography and meteorology which pertain directly to engineering applications. *Prereq:* SC104, SC106 or SC114; SP201 or SP211.

SO241 General Meteorology (3-0-3). Introductory study of the atmosphere. *Prereq:* SM201 or SM211, SP201 or SP211.

SO312 Environmental Dynamics (3-0-3). Basic fluid equations applied to a study of the ocean and the atmosphere. *Prereq:* SM212, SO212, SO241, SP212.

SO411 Naval Oceanographic Applications (3-2-4). Applications of the marine environment to naval operational planning, strategy, and tactics. *Prereq:* SO212 or SO221, SO241.

SO412 Environmental Instruments (2-2-3). A study of theoretical and practical characteristics of instruments used in collecting oceanographic and meteorological data. *Prereq:* SO212 or SO221; SO241.

SO415 Environmental Pollution (2-2-3). Concerns environmental problems involving air and water. Topics include pollution sources and control, climatology, solid wastes, recycling, noise, and legal aspects. Laboratory work includes field trips and pollution surveys. *Prereq:* SO212 or SO221, or permission.

SO421 Ocean Waves and Tides (2-2-3). A study of time-dependent motion within the sea, concentrating on the creation, propagation, and forecasting of wind waves. *Prereq:* SO312 or permission.

SO422 Nearshore Oceanography (3-0-3). Examines the oceanographic regime from the continental break to the intertidal zone, concentrating on shallow water wave, surf, and beach processes. *Prereq:* SO212 or SO221.

SO423 Physical Oceanography (3-0-3). A detailed examination of ocean dynamics and classical wind theory using vector notation. *Prereq:* SO312.

SO441 Synoptic Meteorology (2-2-3). A practical course in meteorological analysis and forecasting as applied to operational planning. *Prereq:* SO241.

SO442 Tropical Meteorology (2-2-3). A study of the special processes affecting meteorological analysis and forecasting in the tropics with particular emphasis on hurricane/typhoon prediction, creation, movement, and decay. *Prereq:* SO241.

SO443 Physical Meteorology (3-0-3). A detailed examination of atmospheric dynamics and classical wind theory using thermodynamic laws and vector notation. *Prereq:* SO312.

SO444 Climatology (3-0-3). A climatic approach to weather phenomena. *Prereq:* SO241.

SO451 Biological Oceanography (2-2-3). An introduction to the ocean as a biological environment. Laboratory work includes practical studies of the biology of the Chesapeake Bay. *Prereq:* SO212 or SO221, or permission.

SO461 Geological Oceanography (2-2-3). Introduction to marine geological methods, instrumentation and applications. Processes of marine erosion and deposition, marine sediment types and distributions. Origin, structure, and geomorphology of the ocean basins and continental margins. *Prereq:* SG161 or permission.

SO462 Geophysics (3-0-3). Physics of planetary interiors with emphasis on recent developments in plate tectonics and astrogeology. *Prereq:* SP212, SG161 or permission.

SO471 Chemical Oceanography (2-2-3). The modern approach to the ocean as a chemical system. Laboratory instruction emphasizes principles rather than specific methods. Classical concepts are discussed, as well as newer trends. *Prereq:* SO212 or SO221 or permission.

SO491 & SO492 Oceanography Research Project (0-2-1, 0-2-1).

SO493 & SO494 Oceanography Research Project (0-4-2, 0-4-2).

SO495 & SO496 Oceanography Research Project (0-6-3, 0-6-3).

Department of Physics

Physics Major

The major program in Physics: (1) presents fundamental physical concepts and principles in such a way as to emphasize their general usefulness and (2) lays a strong foundation for further work in a broad range of technical fields. Some of the topics treated in the sequence of courses are the origin, propagation, and reception of waves of all kinds; field concepts, theory of relativity, basic theory of quantum mechanics, and statistical mechanics. All are studied with the object of providing an open-minded and creative approach to the physical world—an approach increasingly important to those who will be leaders in our modern Navy. A solid background in physics achieved at the Academy will facilitate subsequent specialization in any technical area.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212, SM311, SM312,

Science: (See major);

Humanities/Social Sciences: HE300* and four elective courses;

Language: none;

Special: none;

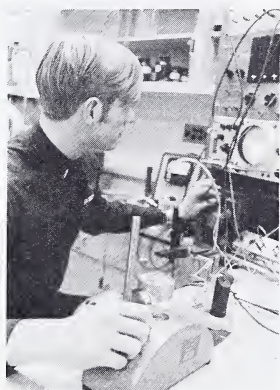
Major: SP221, SP222, SP224, SP321, SP322, SP330, SP431, SP433, SP481, SP482, plus two physics electives and one elective from engineering, science, or mathematics.

* Taken during second class summer



Engineering Physics Major

Engineering Physics is an inter-disciplinary major providing balanced course sequences in physics, mechanical engineering, and mathematics. The broad scope of the course prepares the future officer technically for a professional career in the naval service. Throughout the program, the midshipman is encouraged to develop insight into the application of concepts which will enable him to pursue any one of a number of technical areas of graduate study. Engineering Physics provides a sound background for further concentration in physics, ordnance engineering, mechanical engineering, and other areas of engineering based on physics and applied mathematics. The curriculum is especially suited to provide a strong foundation for the nuclear power training program.



Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EW301, NS300*, NS302, NL302, NL451, NS452 or NL454 or NPP;

Mathematics: SM211, SM212, SM311, SM312;

Science: (See major);

Humanities/Social Sciences: HE300* and four elective courses;

Language: none;

Special: EM216, EM311, EE331, EE332, ES410;

Major: SP221, SP222, SP321, SP322, SP433, SP434, EM213, EM312, EM317, EM411, plus one elective from engineering, science, or mathematics.

* Taken from second class summer

Physics Courses

SP201 & SP202 Basic Physics I & II (3-2-4, 3-2-4).

A two-semester sequence for majors in non-technical fields. Introduces the basic concepts and language of the physics of force, motion, vibrations, waves, electricity, magnetism, atomic and nuclear phenomena. *Prereq: SM101 for SP201; SP201 for SP202.*

SP211 & SP212 General Physics I & II (3-2-4, 3-2-4).

Emphasizes the fundamental principles of classical physics; however, contemporary applications are introduced as appropriate. The topics covered are mechanics, electricity, magnetism, wave motion, sound, and light. *Prereq: SM111 for SP211; SP211 for SP212.*

SP221 Physical Mechanics I (3-2-4).

The first course in physics for majors in physics and in engineering physics. This course provides the basic classical mechanics for further study in physics. *Prereq: SM111 or approval of Department Chairman.*

SP222 Electricity and Magnetism I (3-2-4).

A first course in electricity and magnetism with emphasis on the concepts of fields and potential. The course culminates in the formulation of Maxwell's equations. *Prereq: SP221 or SP211.*

SP224 Thermal Physics (3-0-3).

Develops the theoretical structure of thermodynamics with applications to physical problems. Introduces the kinetic theory of gases and classical statistical mechanics. *Prereq: SP221 or SP211.*

SP301 Modern Physics (3-0-3).

A survey of the significant discoveries and developments marking the progress of physics during the 20th century. Emphasis is placed on the atom and its nucleus. *Prereq: SP202, SP212, or SP222.*

SP311 Astronomy I (3-0-3).

The fundamentals of astronomy as a physical and mathematical science, with particular emphasis on the planets, moon, comets, meteors and the solar system as a whole. Astronomical instruments and observational technique will be studied. Opportunity will be made for observing sessions at the observatory. *Prereq: SP202 or SP212 or SP222.*

SP312 Astronomy II (3-0-3). The application of fundamental physics to the wider vistas of the stars, the galaxy, and sidereal universe. Topics in stellar evolution and cosmology. Occasional observing sessions. *Prereq: SP202 or SP212 or SP222.*

SP321 Wave Physics (3-2-4).

An introductory course for physics and engineering physics majors in such wave phenomena as reflection, refraction, interference, and diffraction. Applications are made to both acoustics and optics. *Prereq: SP221; Coreq: SP222.*

SP322 Atomic and Nuclear Physics (3-2-4).

A first course in the physics of the atom for majors in physics and engineering physics. *Prereq: SP321.*

SP330 Physical Mechanics II (3-0-3).

Physical mechanics at the intermediate level intended to provide a basis for further study in either classical or quantum physics. *Prereq: SP221, SP212.*

SP411 Underwater Acoustics and Sonar (3-0-3).

A fundamental study of sound propagation in the ocean environment as it relates to the design and operation of sonar. *Prereq: SP202, SP212, or SP321.*

SP431 Electricity and Magnetism II (3-0-3).

A course in electromagnetic theory required for all majors in physics and electrical engineering. Maxwell's equations are formulated in the notation of vector analysis and applied to various situations. *Prereq: SP222 and SM311.*

SP433 Quantum Physics (3-0-3).

An introduction to quantum mechanics and its application to atomic phenomena. The basic postulates of quantum mechanics are presented and related to physical measurements. *Prereq: SP322.*

SP434 Nuclear Physics (3-2-4).

The basic experimental facts of purely nuclear origin and their interpretation in terms of quantum theory. *Prereq: SP433.*

SP436 Acoustics (3-2-4).

The fundamental principles of acoustics with emphasis on numerical methods of analysis. *Prereq: SP211 or SP321, and SM212.*

SP438 Optics (3-2-4). Introduction to modern optics including the use of Fourier transforms in the study of diffraction, the concepts of partial coherence, interference theory, holography, polarization, and the optics of solids. *Prereq: SP321, SP431.*

SP440 Solid State Physics (3-0-3). An introductory course in physics of the solid state. The topics included are crystal structures, thermal properties, free electron model, band theory, magnetism resonance, and semiconductors. *Prereq: SP433.*

SP445 Stellar Astrophysics (3-0-3). A study of the basic physics of stellar properties and processes: mass, luminosity, stellar spectra, chemical composition, stellar energy sources, nucleosynthesis, stellar evolution, and stellar models. *Prereq: SP224, SP322.*

SP450 Statistical Physics (3-0-3). The theoretical structure of classical and quantum statistical mechanics with particular emphasis on such concepts as the density matrix, the occupation number repre-

sentation, and second quantization. *Prereq: SP224, SP433.*

SP481 & SP482 Physics Seminar I & II (1-0-1, 1-0-1). A seminar with topics selected from modern physics. *Prereq: SP330.*

SP491 & SP492 Physics Research Project (0-2-1, 0-2-1). A creative scientific laboratory project of limited scope in the student's field of interest. A faculty adviser must approve and monitor each project. *Prereq: Approval of Department Chairman.*

SP493 & SP494 Physics Research Project (0-4-2, 0-4-2). A creative scientific laboratory project of limited scope in the student's field of interest. A faculty adviser must approve and monitor each project. *Prereq: Approval of Department Chairman.*

SP495 & SP496 Physics Research Project (0-6-3, 0-6-3). A creative research project in the student's field of interest. A faculty adviser must approve and monitor each project. *Prereq: Approval of Department Chairman.*

Department of Computer Science

Computer Science Courses

The following courses are required for each midshipman regardless of his major:

SI101 & SI102 Introduction to Computing I and II (1-0-1, 1-0-1). Digital computer organization and principles. Development and use of algorithms.

The following courses are offered as electives:

SI211 Advanced Programming (3-0-3). Machine and assembly language, compilers and interpreters. Program segmentation and linking. Macros, subroutines, and utility routines. Input/output, peripheral devices, and auxiliary storage. Program efficiency and documentation. *Prereq: SI102.*

SI301 Data Structures (3-0-3). Data representation and information management. Lists, strings, arrays, trees, graphs. Storage structures, allocation, and collection. Sorting techniques, symbol tables, and searching. *Prereq: SI211.*

SI302 Fundamentals of Computer Logic (3-0-3). Applications of Boolean algebra to switching circuits, number representation, and logic networks. Minimization techniques. Analysis of fundamental computer circuits. *Prereq: SI102.*

SI304 Programming Languages (3-0-3). Functional and technical characteristics of algorithmic, problem-oriented, list processing, string manipulating, and simulation languages. Survey of important programming languages. *Prereq: SI102.*

Programming and de-bugging in the BASIC language.

SI411 Sequential Machines (3-0-3). Theoretical definition and representation of finite automata. Structural and behavioral aspects of sequential machines and variants of finite automata. *Prereq: Consent of instructor.*

SI412 Compiler Construction (3-0-3). Study of techniques involved in the analysis of source language and generation of efficient object code. *Prereq: Consent of instructor.*

SI421 Discrete Simulation (3-0-3). Simulation and modeling of discrete systems. Introduction to queueing theory and stochastic processes. Comparison of simulation languages. Design, analysis, and validation of simulation models. *Prereq: Consent of instructor.*

SI422 Large-Scale Information Processing Systems (3-0-3). Problems of organization, design, analysis, and documentation of major types of information processing systems, such as business data processing systems, management information systems, command and control systems, and large



computer centers. *Prereq: SI421 or consent of instructor.*

SI431 Computer Organization (3-0-3). Organization, logic design, and components of digital computing systems. Overall organization of modules into a system. *Prereq: SI302 or consent of instructor.*

SI432 Computer Systems Management (3-0-3). Planning, specification, and procurement of a com-

puter system under DOD rules. Organization and management of a computer center. *Prereq: SI431 or consent of instructor.*

SI491 & 492 Research Project (3-0-3, 3-0-3). Independent study and research under the guidance of a faculty advisor. May be continued beyond one semester if the project is of sufficient magnitude and depth. *Prereq: Approval by Chairman, Computer Science Department.*

Division of Naval Command and Management

Department of Management Science

Department of Behavioral Science

Department of Seamanship and Tactics

Department of Navigation

Department of Management Science

Analytical Management Major

The Analytical Management major examines existing theory and practice in the management of personnel, materiel, and financial resources. The program provides the future naval officer with an understanding of the basic functions of management and the mathematical techniques employed to recognize, analyze, and solve management problems; to set and monitor progress toward realistic goals; and to use the most appropriate techniques in decision-making.

The Analytical Management major includes the integrally related fields of personnel, financial and material management, computer science and operations analysis.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM211, SM239, SM269;

Science: SP201, SP202;

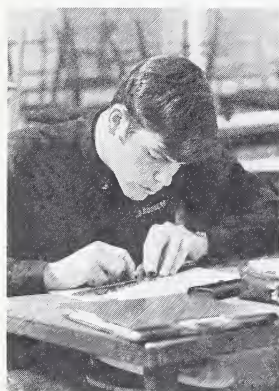
Humanities/Social Sciences: HE300*, FE210, one economics elective plus two other electives;

Language: none;

Special: one math or computer science elective;

Major: NM213 NM214, NM304, NM313, NM322, NM411, NA311, and three additional major electives.

* Taken during second class summer



Management Science Courses

NM213 (311) Accounting (2-2-3). An introductory course in the basic principles of accounting.

NM214 (312) Financial Management (3-0-3). A study of the theory and techniques of financial management applied in industry and the Federal Government. *Prereq:* NM213.

NM304 Personnel Management (3-0-3). Emphasizes theory and fundamentals of leadership and personnel administration. Military and civilian personnel practices are examined and evaluated. *Prereq:* NM313.

NM313 (212) Organization and Management (3-0-3). An introductory course in the theory and practice of management including the analytical management tools.

NM322 Material Management (3-0-3). Examines concepts of integrated logistics and life cycle support, requirements determination, procurement and contract administration, inventory control, maintenance

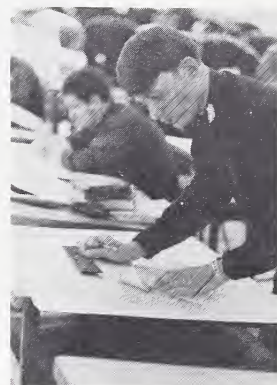
equipment with primary emphasis on quantitative techniques. *Prereq:* NM213, NM313, SM239.

NM411 Management Information Systems (3-0-3). Development of management information systems, and integration of data processing and systems analysis into management operations. *Prereq:* NM322.

NM412 Advanced Studies in Management (3-0-3). Advanced course in administrative policies and practices. Case studies and outside readings emphasize the management process and executive development. *Prereq:* NM214, NM304.

NM421 Cost Accounting (3-0-3). A study of the concepts and techniques of cost accounting. Primarily concerned with the derivation of product cost arising from materials, labor, services employed, and overhead. *Prereq:* NM214.

NM491-492 Management Research Project (3-0-3, 3-0-3). Independent study and research under the guidance of a faculty adviser. *Prereq:* Approval of Department Chairman.



Operations Analysis Major

The major in Operations Analysis is concerned with practical and scientific decision-making applied to the resolution of naval operational problems. The mathematics of probability, together with tools drawn from other disciplines, provide the means for analytical problem-solving.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: SM211, SM212;

Science: SP201, SP202;

Humanities/Social Sciences: HE300*, FE210 and two electives;

Language: none;

Special: none;

Major: SM239, SM269, SM261, SI211 or SI304, FE421, NA311, NA312, NA411, NA412, NA441, and three major electives.

* Taken during second class summer

Operations Analysis Courses

NA311 Introduction to Naval Operations Analysis (3-2-4) An introduction to the techniques of modeling and quantitative analysis applied to specific naval operational problems, including

search and patrol, screening, anti-air warfare, mining, equipment reliability and decision rules. *Prereq:* SM239.



NA312 Methods of Operations Analysis I (3-0-3). Investigation of linear programming and an introduction to integer programming via Gomory's cutting plane algorithm as well as network analysis and deterministic dynamic programming are introduced. *Prereq:* SM261.

NA411 Methods of Operations Analysis (3-0-3). An introduction to nonlinear programming, discrete parameter Markov chains, nondeterministic dynamic programming, and queueing theory. Stress is given to applications of typical operations analysis problems. *Prereq:* SM269, NA312.

NA412 Applications of Operations Analysis (2-2-3). A capstone course for Operations Analysis majors. Operations analysis techniques are applied using student projects, case studies and visiting lecturers to relate the applications of operations analysis techniques to current military and industrial problems. *Prereq:* NA311, NA411.

NA421 Games of Strategy and Gaming (2-2-3). Introduces game theory as limited to two-person, zero-sum games. Introduces manual, man-machine,

and machine games as tools for obtaining complex problem solutions. *Prereq:* SI102, SM239, SM261.

NA431 Decision Theory (3-0-3). A mathematical study of the decision-making process with particular emphasis on min-max and Bayes strategies and hypothesis testing using regression, correlation, analysis of variance, and non-parametric methods. *Prereq:* NA441.

NA432 Logistics (3-0-3). Introduces techniques of operations analysis applicable to the solution of logistics problems. *Prereq:* NA312.

NA441 Applied Statistics (3-0-3). The application of statistical methods for determining the general characteristics of a body of data, summarizing and analyzing such data using such techniques as estimation, hypothesis testing, analysis of variance, regression and correlation. *Prereq:* SM269.

NA491-492 Operations Analysis Research Project (3-0-3, 3-0-3). Independent study and research under a faculty advisor. *Prereq:* Approval of Department Chairman.

Department of Behavioral Science

Behavioral Science Courses

Two Behavioral Science courses are required for each midshipman regardless of his major.

NL302 Leadership (3-0-3). Theory and techniques of naval leadership as developed through principles of psychology and management. Emphasis is placed on the fundamental concepts of leadership and their relationship to human behavior.

NL451 (401) Law for the Junior Officer (3-0-3). The academic and practical aspects of law as they apply to the naval officer. *Prereq:* 1/C standing.

In addition, the following course is required for midshipmen who are to be commissioned in the Marine Corps:

NL454 The Junior Marine Corps Officer (2-0-2). A culminating course of professional instruction covering those duties and responsibilities normally

encountered by a Company Grade officer ashore and afloat. *Prereq:* 1/C standing.

The following courses are offered as electives:

NL211 General Psychology (3-0-3). An introduction to the theory of human behavior and its relationship to effective leadership.

NL422 Organizational Behavior (3-0-3). An introduction to the dynamics of effective behavior. Such factors as group structure, cohesiveness, attitudes, group problem-solving, interpersonal relationships, and leadership styles are included. *Prereq:* NL211.

Department of Seamanship and Tactics

Seamanship and Tactics Courses

Each midshipman, regardless of his major, must complete the following courses:

NS101 Fundamentals of Naval Science (2-2-3). A course preparing midshipmen for the Naval Academy Training Squadron (NATRON) cruise. Instruction centers on shipboard organization and watches and on the deck, operations, and navigation departments. Basic shiphandling and seaman-ship skills are introduced on board the YPs.

NS300 Operations and Tactics I (2-2-3). An introduction to all phases of small ship operation. Emphasis on practical instruction highlighted by a

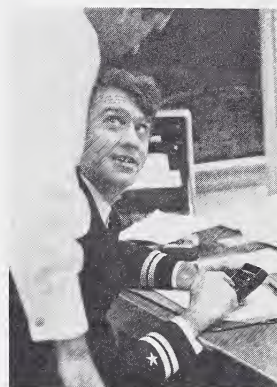
five-day underway exercise in yard patrol craft with midshipmen performing all shipboard duties. Taken during 2/C summer.

NS302 Operations and Tactics II (1-2-2). Employment of operational procedures in a shipboard environment, including advanced formation maneuvering, screening, and introductory antisubmarine warfare procedures. Combat Information Center exercises, ashore and afloat. *Prereq: NS300.*

In addition, the following is required of all midshipmen who are to be commissioned in the Navy, except those destined for Medical School or Nuclear Power School:

NS452 The Junior Naval Officer (3-0-3). A culminating course of professional instruction covering those duties and responsibilities normally en-

countered by a junior naval officer on board ship. *Prereq: 1/C standing.*



Department of Navigation

All midshipmen, no matter what their major, must complete the following courses.

NN201 Navigation I (3-2-4). Terrestrial navigation, including shiphandling, piloting, maneuvering board for relative motion problems, and Rules of the Nautical Road. Practical exercises and YP drills afloat. *Prereq: NS101.*

NN202 Navigation II (3-2-4). Celestial navigation including electronic and advanced navigation systems; further instruction in maneuvering board problems and Rules of the Nautical Road. Practical exercises and drills afloat. *Prereq: NN201.*

The following courses are offered as electives:

NN311 Surface/Subsurface Navigation Systems (3-0-3). An advanced study and application of surface and subsurface navigation including celestial, electronic, hyperbolic, and inertial methods and systems. *Prereq: NN202.*

celestial and airways navigation methods and procedures. *Prereq: NN202.*

NN312. Air Navigation Systems and Air Traffic Control (3-0-3). An advanced study and application of air navigation, including electronic,

NN491-492 Navigation Research Project (3-0-3). Research, analysis and report on some navigation topic chosen by the student and approved by the Head of the Navigation Department. *Prereq: 1/C standing.*





Division of United States and International Studies

Department of Area–Language Studies
Department of Economics
Department of Political Science

Department of Area-Language Studies

European Studies Major—French or German

This major is designed to provide language proficiency, wide knowledge of European civilization and its role in contemporary world affairs, and in-depth knowledge of the French or German nation.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Sciences: HE300*, HH130, and three electives;

Language (See major);

Special: One economics elective and one free elective;

Major: For major with French: FF101–102 (must be validated), FF201, FF202, FF301, FF302, HH128, HH431, FF411, FF412, FP484 or HH482, and two of the following: FE212, FE321, FE411, FP322, FP342, FP344, HH324, HH342, HH452;

For major with German: FG101–102 (must be validated), FG201, FG202, FG301, FG302, HH128, HH431, FG411, FG412, FP484 or HH482, and two of the following: FE212, FE321, FE411, FP322, FP342, FP344, HH324, HH342, HH452.

* Taken during second class summer

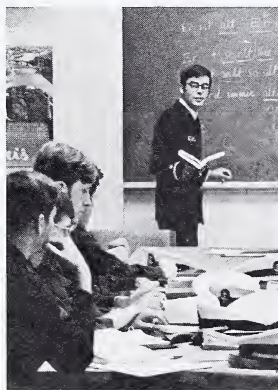
French Courses

FF101 & FF102 Basic French I & II (3–0–3, 3–0–3).
Emphasizes the spoken language.

FF201 & FF202 Intermediate French I & II (3–0–3, 3–0–3). Continues development of oral, reading

and writing skills. Includes area and cultural topics.
Prereq: FF102.

FF301 & FF302 Advanced French with Civilization Readings I & II (3–0–3, 3–0–3). Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of French civilization. *Prereq:* FF202.



FF411 Development of French Civilization (3-0-3). From the origins to World War II. *Prereq: FF302 or equivalent*

FF412 Modern France (3-0-3). Contemporary French society, institutions, and national policies. *Prereq: FF302 or equivalent.*

FF421 & FF422 Representative Readings in French Literature I & II (3-0-3, 3-0-3). Analysis and discussion of works of leading writers of various periods. *Prereq: FF302 or equivalent.*

FF423 & FF424 Contemporary French Literature I & II (3-0-3, 3-0-3). Proust, Gide, Mauriac, Malraux, Sartre, Camus, and others. *Prereq: FF302 or equivalent.*

FF481 & FF482 Independent French Study Project I & II (3-0-3, 3-0-3). Individual projects relating to the French European Studies major. Substantial term paper in French required. *Prereq: Permission of Department Chairman.*

German Courses

FG101 & FG102 Basic German I & II (3-0-3, 3-0-3). Emphasizes the spoken language.

FG201 & FG202 Intermediate German I & II (3-0-3, 3-0-3). Continues development of oral, reading, and writing skills. Includes area and cultural topics. *Prereq: FG102.*

FG301 & FG302 Advanced German with Civilization Readings I & II (3-0-3, 3-0-3). Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of German civilization. *Prereq: FG202.*

FG411 Development of German Civilization (3-0-3). From the medieval period to World War II. *Prereq: FG302 or equivalent.*

FG412 Modern Germany (3-0-3). Contemporary German society, institutions, and national policies. *Prereq: FG302 or equivalent.*

FG421 & FG422 Representative Readings in German Literature I & II (3-0-3, 3-0-3). Analysis and discussion of works of leading writers of various periods. *Prereq: FG302 or equivalent.*

FG423 & FG424 German Literature of the Twentieth Century I & II (3-0-3, 3-0-3). Literary movements and selected authors: Hauptmann, Mann, Hesse, Borchert, Kafka, Langgässer, Wiechert, Brecht, Dürrenmatt, and others. *Prereq: FG302 or equivalent.*

FG425 & FG426 Goethe, Schiller, and Lessing (3-0-3, 3-0-3). Selected works, with emphasis on their influence on literature and history. *Prereq: FG302 or equivalent.*

FG481 & FG482 Independent German Study Project I & II (3-0-3, 3-0-3). Individual projects relating to the German European Studies major. Substantial term paper in German required. *Prereq: Permission of Department Chairman.*

FG484 Seminar in German Military-Naval History and Current Doctrine (3-0-3). Survey of history and traditions of German armed forces; analysis of their current organization, doctrine, and role in military-political affairs. *Prereq: FG302 or equivalent.*

Italian Courses

FI101 & FI102 Basic Italian I & II (3-0-3, 3-0-3). Emphasizes the spoken language.

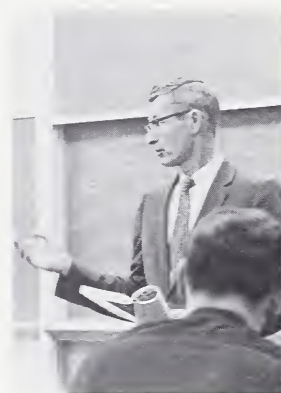
FI201 & FI202. Intermediate Italian I & II (3-0-3, 3-0-3). Continues development of oral, reading, and writing skills. Includes area and cultural topics. *Prereq: FI102.*

FI301 & FI302 Advanced Italian and Cultural Readings I & II (3-0-3, 3-0-3). Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of Italian culture and civilization. *Prereq: FI202.*

FI411 Development of Italian Civilization (3-0-3). From the feudal period to World War II. *Prereq: FI302.*

FI412 Modern Italy (3-0-3). Contemporary Italian society, institutions, and national policies. *Prereq: FI302.*

FI481 & FI482 Independent Italian Study Project I & II (3-0-3, 3-0-3). Individual projects relating to the Italian European Studies major. Substantial term paper in Italian required. *Prereq: Permission of Department Chairman.*





Far Eastern Studies Major—Chinese

This major is designed to provide foundation skills in using the Chinese language; knowledge of Far Eastern political, economic, social, cultural, and military affairs; and knowledge of relations of Far Eastern nations with the United States and other world powers.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Sciences: HS300*, HH351 and three electives;

Language (See major);

Special: one economics elective;

Major: FC103, FC204, FC301, FC302, FP368 or FP371, FP357, FC401, FC402, FP484 or HH482 and two of the following: FE212, FE321, FE411, FP312, FP342, FP344, FP362, FP368, FP371, HH322.

* Taken during second class summer

Chinese Courses

FC101 & FC102 Basic Chinese I & II (3-0-3, 3-0-3). Emphasizes the spoken language. Provides introduction to writing system.

FC201 & FC202 Intermediate Chinese I & II (3-0-3, 3-0-3). Continues development of oral skills. Includes exercises in character recognition, and reading of graded cultural texts. *Prereq:* FC102.

FC103 & FC204 Intensive Chinese I & II (5-0-5, 5-0-5). Intensive versions of Basic Chinese I & II and Intermediate Chinese I & II, listed above. Designed especially for midshipmen starting the

Far Eastern Studies—Chinese major in 3/C year. *Prereq:* None for FC103; FC103 or FC101-102 for FC204.

FC301 & FC302 Advanced Chinese I & II (3-0-3, 3-0-3). Further development of audio-lingual skills and competence in reading. Emphasis on Chinese cultural patterns. *Prereq:* FC202 or FC204.

FC401 & FC402 Reading and Discussions in Modern Chinese I & II (3-0-3, 3-0-3). Selected texts on major aspects of Chinese areas, civilization, and culture. *Prereq:* FC302.

Japanese Courses

FJ101 & FJ102 Basic Spoken Japanese I & II (3-0-3, 3-0-3). Concentrates on spoken language.

Includes basic cultural material. Does not apply toward degree requirements.

Latin American Studies Major—Spanish

This major is designed to provide language proficiency, in-depth knowledge of Latin America, and general knowledge of relations between Latin America and the United States and the role of Latin America in world affairs.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Sciences: HE300*, FP323 or FP324, and three electives;
Language (See major);

Special: One economics elective and one free elective;

Major: FS101-102 (must be validated), FS201, FS202, FS301, FS302, HH222, FP323 or FP324, FS413, FS412, FP484 or HH482, and two of the following: FE212, FE321, FE411, FP210, FP322, FP342, FP344, FP362.

* Taken during second class summer

Spanish Courses

FS101 & FS102 Basic Spanish I & II (3-0-3, 3-0-3)
Emphasizes the spoken language.

FS201 & FS202 Intermediate Spanish I & II (3-0-3, 3-0-3)
Continues development of oral, reading, and writing skills. Includes area and cultural topics. *Prereq:* FS102.

FS301 & FS302 Advanced Spanish With Civilization Readings I & II (3-0-3, 3-0-3)
Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of Hispanic civilization. *Prereq:* FS202.

FS411 Development of Latin American Civilization (3-0-3)
From early Indian cultures to 1900. *Prereq:* FS302 or equivalent.

FS412 Contemporary Latin American Civilization (3-0-3)
Current social, economic, cultural, and political patterns and problems. *Prereq:* FS302 or equivalent.

FS413 Spanish Civilization (3-0-3)
Cultural history, contemporary institutions and society. *Prereq:* FS302 or equivalent.

FS421 & FS422 Representative Readings in Spanish-American Literature I & II (3-0-3, 3-0-3)
Novels, stories, essays, and plays reflecting the characteristics and civilizations of major South American countries. *Prereq:* FS302 or equivalent.

FS431 & FS432 Representative Readings in Spanish Literature I & II (3-0-3, 3-0-3)
Analysis and discussion of works of leading writers from various periods. *Prereq:* FS302 or equivalent.

FS481 & FS482 Independent Spanish Study Project I & II (3-0-3, 3-0-3)
Individual projects relating to the Spanish Latin American Studies major. Substantial term paper in Spanish required. *Prereq:* Permission of Department Chairman.

Portuguese Courses

FB101 & FB102 Basic Portuguese I & II (3-0-3, 3-0-3)
Emphasizes the spoken language.

FB201 & FB202 Intermediate Portuguese I & II (3-0-3, 3-0-3)
Continues development of oral, reading, and writing skills. Includes area and cultural topics. *Prereq:* FB102.

FB301 & FB302 Advanced Portuguese with Civilization Readings I & II (3-0-3, 3-0-3)
Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of Brazilian culture. *Prereq:* FB202.

FB411 Development of Luso-Brazilian Civilization (3-0-3)
From the colonial beginnings of Brazil to the end of the Imperial period in 1889. *Prereq:* FB302.

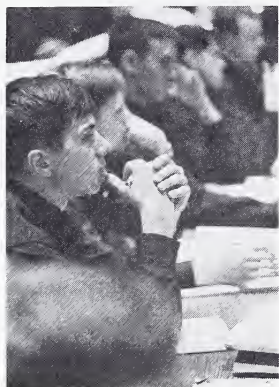
FB412 Contemporary Brazil (3-0-3)
Brazilian society, cultural life, economic and political affairs; inter-American relations. *Prereq:* FB302.

FB481 & FB482 Independent Portuguese Study Project I & II (3-0-3, 3-0-3)
Individual projects relating to the Portuguese Latin American Studies major. Substantial term paper in Portuguese required. *Prereq:* Permission of Department Chairman.

English Course

FX101 & FX102 English for Non-Native Speakers (3-0-3, 3-0-3)
Alternative to the required 4 C English Composition & Literature. *Prereq:* Permission of Department Chairman.





Soviet Studies Major—Russian

This major provides proficiency in the Russian language, in-depth knowledge of the Soviet Union, and general knowledge of the role of the Soviet Union in contemporary world affairs.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Sciences: HE300*, HH130 and three electives;

Language (See major);

Special: One economics elective;

Major: FR103, FR204, FR301, FR302, HH110, HH321, FR411, FR412, FP484 or HH482, and two of the following: FE212, FE321, FE411, FP312, FP322, FP342, FP344, FP367, HH322, HH462.

* Taken during second class summer

Russian Courses

FR101 & FR102 Basic Russian I & II (3-0-3, 3-0-3). Emphasizes the spoken language.

FR201 & FR202 Intermediate Russian I & II (3-0-3, 3-0-3). Continues development of oral, reading, and writing skills. Includes area and cultural topics. *Prereq:* FR102.

FR103 & FR204 Intensive Russian I & II (5-0-5, 5-0-5). Intensive versions of Basic Russian I & II and Intermediate Russian I & II, listed above. Designed especially for midshipmen starting the Soviet Studies—Russian major in 3/C year. *Prereq:* None for FR103; FR103 or FR101-102 for FR204.

FR301 & FR302 Advanced Russian with Civilization Readings I & II (3-0-3, 3-0-3). Develops fluency in conversation and facility in reading and writing. Topics emphasize main aspects of Russian civilization. *Prereq:* FR202 or FR204.

FR411 Development of Russian Civilization (3-0-3). From the 10th century to World War II. *Prereq:* FR302 or equivalent.

FR412 Modern Russia (3-0-3). The Soviet Union since World War II; social, cultural, economic patterns; technology; armed forces; national policies. *Prereq:* FR302 or equivalent.

FR421 & FR422 Representative Readings in Russian Literature I & II (3-0-3, 3-0-3). Analysis and discussion of works of the 19th and 20th centuries. *Prereq:* FR302 or equivalent.

FR481 & FR482 Independent Russian Study Project I & II (3-0-3, 3-0-3). Projects relating to the Soviet Studies—Russian major. Substantial term paper in Russian required. *Prereq:* Permission of Department Chairman.

Department of Economics

Economics Major

The major in Economics is designed to acquaint prospective naval officers with both macro- and micro-economic theory, with quantitative methods in economics, with economic problem-solving in an institutional context, and with international economic relations of the United States.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Science: HE300* and one elective course;

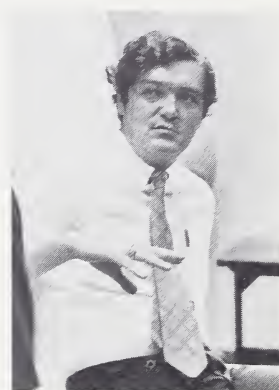
Language: six semesters of a modern language;

Special: none;

Major: FE213, FE214†, FP110, FE331 or FE332 or SM270, FE341 or FE421; FE312; FE482; two 200–300 elective courses in economics; two 400-level elective courses in economics.

* Taken during second class summer

† In exceptional cases, FE210 may substitute for the requirement of FE213 and FE214.



Economics Courses

FE213 & 214 Economics: Principles and Policies (3–0–3, 3–0–3). A two-semester introductory course covering elementary economic theory and its application to contemporary problems.

FE210 Basic Economics (3–0–3). The elements of economics with a more rapid coverage than FE213 and FE214. Topics include national income, income determination, money, deposit-creation, public finance, price theory, international trade and economic growth.

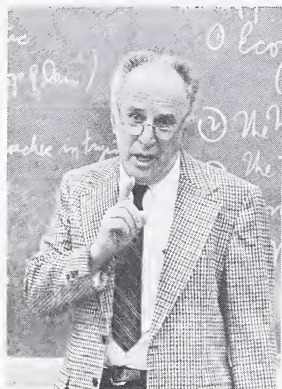
FE212 Economic Geography (3–0–3). The study of earth science insofar as it affects man's patterns of production, distribution, and consumption.

FE311 History of Economic Thought (3–0–3). Surveys the development of economic ideas, stressing 18th and 19th century economic thinking, the mathematical economists, Keynes, and post Keynesian theories. *Prereq:* FE210 or FE214.

FE312 Macroeconomics (3–0–3). The significance and determinants of the aggregate levels of income and employment, the price level, consumption, interest rates, and investment. *Prereq:* FE210 or FE214.

FE321 Comparative Economic Systems (3–0–3). A comparison of the various methods, practical and theoretical, of economic organization, highlighting such problems as production, distribution, and growth under the system of free enterprise, mixed capitalism, and detailed planning.

FE331 Descriptive Economic Statistics (3–0–3). Introduction to statistical techniques used in financial and economic analysis. Includes computation and interpretation of central tendency, dispersion, skewness, univariate and bivariate distribution, economic index numbers, and time series. *Prereq:* FE210 or FE214.



FE332 Econometrics (3-0-3). Quantification of basic economic theory: multiple regression, correlation, and identification techniques for the construction and testing of economic models, and a study of selected alternative models of particular economic interest. *Prereq:* FE210 or FE214 and Calculus 1 & II.

FE341 Price Determination and Decision-Making (3-0-3). Microeconomics: the theory of market price, factor-pricing, the dynamics of supply and demand, plus the application of economic reasoning to business and Defense decision-making. *Prereq:* FE210 or FE214.

FE351 The Economics of Government-Business Relations (3-0-3). A study of the economic interaction of government and the business community, emphasizing the role of DOD. *Prereq:* FE210 or FE214.

FE352 The Economics of Transportation (3-0-3). Economic costs and benefits of competing transportation systems, with special attention to the merchant marine. *Prereq:* FE210 or FE214.

FE361 Urban Economics (3-0-3). An economic survey of the problems of cities, with attention to public services, poverty, and racial discrimination. *Prereq:* FE210 or FE214.

FE362 The Economics of Technology (3-0-3). An analysis of productivity growth over time, innovation and transfer of technology, automation, costs and benefits of research and development. *Prereq:* FE210 or FE214.

FE411 Economic Development (3-0-3). A study of the developmental process with emphasis given to the role of population, natural resources, capital, technology, and institutions. Trade, labor, nationalism, and social unrest are considered. *Prereq:* FE210 or FE214.

FE412 International Trade and Finance (3-0-3). An introduction to international trade and finance with emphasis on the balance of payments, trade policies and practices, and the functions of international agencies. *Prereq:* FE210 or FE214.

FE415 Environmental Economics (3-0-3). An in-depth study focusing on the economic aspects of environmental problems. Topics include the nature of environmental pollution, economic growth and its shortcomings, the economic tools used in analyzing environmental problems, and alternate economic, technological and legal strategies available in resolving problems facing the environment. *Prereq:* FE210 or FE214.

FE421 The Economics of Defense Management (3-0-3). Economic analysis stressing war and cold war fiscal and monetary policies, the allocation, production, stockpiling, and rationing of materials, plus economic reasoning in Defense Department decision-making. *Prereq:* FE210 or FE214.

FE422 Economics of Labor Relations (3-0-3). A survey of American labor history, union organization, economics of the labor market, and government-labor relationships. Current labor and labor-management problems are stressed. *Prereq:* FE210 or FE214.

FE431 Public Finance (3-0-3). The study of governmental finance with emphasis on fiscal and monetary policy, the budget-making process, the Council of Economic Advisers, the Federal Reserve System, and taxes. *Prereq:* FE210 or FE214.

FE434 Money and Banking (3-0-3). A consideration of commercial and central banking institutions in the United States and how they function to help maintain full employment, price stability, and international monetary equilibrium. *Prereq:* FE210 or FE214.

FE471 Topics in Economics (3-0-3). A tutorial course, tailored to individual enrollees. Open only on instructor's permission to a very limited number of economics majors. It requires extensive reading and writing under faculty supervision.

FE482 Research Seminar in Economics (3-0-3). Methodology and types of research materials available in economics. Research papers will be required in a student's special area of interest. *Prereq:* 1/C only, or instructor's permission.

Department of Political Science

American Political Systems Major

The major in American Political Systems is designed to make prospective naval officers more conversant with the political environment in which they will function and the governmental characteristics of the nation they will serve. It seeks to develop both an understanding of the dynamics of the various American political systems and an ability to analyze critically the governmental processes, relationships, and problems of the United States in today's world.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Science: HE300* and one elective;

Language: six semesters of a modern language;

Special: none;

Major: FP110, FP210, FE210, FP220, plus one approved history or economics elective and six approved political science electives.

* Taken during second class summer

Note: For course descriptions, see listing following International Security Affairs Major.



International Security Affairs Major

The major in International Security Affairs provides midshipmen with the opportunity to gain a basic understanding of international problems. An introduction to the world's state system is followed by more detailed analysis of the United States in world affairs. This is developed in terms of the foreign policy decision-making process, the application of American policies in strategic regions, and in the context of the interests and policies of other major powers.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one elective;

Science: SP201, SP202;

Humanities/Social Sciences: HE300* and one elective course;

Language: six semesters of a modern language;

Special: none;

Major: FP110, FP210, FP220, FE210, one approved history or economics elective plus six approved political science electives.

* Taken during second class summer

Political Science Courses

FP110 United States Government and Constitutional Development (3-0-3). Areas of study include the basic concepts of American democracy, the Constitution and its development, the political process, and the structure and functions of the national government and the factors which influence its operation.

FP120 Introduction to Political Science (3-0-3). An analytical treatment of the major philosophical, conceptual, and theoretical problems of political science; institutional, organizational, and behavioral characteristics of political systems.

FP122 American Political Theory (3-0-3). A detailed analysis of the currents of American political

theory from the 18th century to the present. Traditional concepts are critically analyzed in world perspective.

FP210 Introduction to International Relations (3-0-3). Introduction to the various approaches to international relations; the nature of the international political system; foreign policy analysis; the principles, theories, machineries and major problems of international relations.

FP211 Administration in Government (3-0-3). A critical analysis of the federal administrative organization as an integral part of the political system. *Prereq: FP110.*



FP220 Political Science Methods (3-0-3). A discussion of the philosophy of science for the political scientist and instruction in research methods with emphasis on quantitative techniques. *Prereq: FPA or FPI major or permission of Department Chairman.*

FP222 Political Parties and Pressure Groups (3-0-3). A study of the dynamics of group politics in the American system of government. Emphasizes the roles played by parties, interest groups, public opinion, and elections in the American political process. *Prereq: FP110.*

FP224 American Judicial Systems (3-0-3). The growth and evolution of the American judiciary. Examines the judicial process at all levels of American government with special emphasis on the Federal court system. *Prereq: FP110.*

FP226 Civil-Military Relations (3-0-3). An interdisciplinary approach to the complex nature of civil-military affairs. *Prereq: FP110.*

FP227 The American Presidency (3-0-3). The growth and evolution of the Office of the President, executive agencies; their function, control and problems. Special attention is given to the President's role as Commander-in-Chief, and his relations with the Legislative and Judicial branches. *Prereq: FP110.*

FP229 The Legislative Process (3-0-3). A comparative examination of the legislative process at all levels of American government with special emphasis on Congressional-military relations. *Prereq: FP110.*

FP311 The Development of Political Thought (3-0-3). A study of political philosophy, with emphasis on the roots of democracy: the writings of the major writers from Plato to the present.

FP312 Communism: Theory and Practice (3-0-3). The philosophy of Communism, the Comintern, relations of the Soviet Union with radical parties outside Russia and with European Social Democratic Parties.

FP313 Science, Technology and International Relations (3-0-3). The effect of science and technology on both the national and international political systems. The role of the scientist, development and research in national and world decision-making. Special emphasis is given to nuclear non-proliferation, space co-operation, and environmental control.

FP314 Formulation of U.S. Foreign Policy (3-0-3). The formulation and execution of the various American foreign policies to include: constitutional roles, the decision-making structure, military input to policy-making, the administration of foreign policy; agencies, procedures and practices. Sub-

stantive policy is analyzed in light of decision-theory, ends-means and capability analysis. *Prereq: Upper class.*

FP322 Comparative Government and Politics of Developed Areas (3-0-3). Using a contemporary approach, the course focuses on functional-structural analysis of the industrialized national political systems of Europe and Asia.

FP323 Government and Politics of Latin America (3-0-3). An analytical treatment of the structure and dynamics of independent Latin American political systems, individually and in comparison; parties, interest groups, the military, the church, revolution, foreign policy, and political thought.

FP324 International Relations of Latin America (3-0-3). The Inter-American System; patterns of Inter-Latin American and extrahemispheric relations; the Latin American policy of the United States.

FP342 International Law (3-0-3). A survey of the public law of nations including the law of peace, the law of war, and law of the sea. Problems and case studies are used extensively.

FP344 International Organization and Military Security (3-0-3). A study of the development of international organizations as a response to the security needs of both the national and international communities. Major emphasis is placed on the United Nations and its agencies and regional organizations such as NATO, SEATO and the OAS. *Prereq: FP210.*

FP357 Chinese Political and Military Systems (3-0-3). An examination of Chinese political and military systems from 1927 to the present. Emphasis is placed on economic, political, and foreign policies of the Chinese Communist regime.

FP362 Comparative Government and Politics of Developing Areas (3-0-3). Governmental and political problems, institutions and behavior in developing areas. Political thought, impact of change, leadership and organization in Africa, Asia, and Latin America.

FP365 Strategic Analysis of African Politics (3-0-3). An introduction to the political trends and constitutional developments of present day African governments; their relations with one another and the rest of the world. Attention is directed to the U.S. security aspects of African national growth.

FP367 Soviet Political and Military Systems (3-0-3). The development of the Soviet system of government. Leninism and Stalinism, structure and functions of the central government, Council of Ministers, the Supreme Soviet, Presidium, Central Committee, and Defense Ministry.

FP368 Political and Military Development of Southeast Asia (3-0-3). A systematic comparative approach to the study of Southeast Asia; the influence of colonial political systems, problems of ethnic and racial-language barriers, implications of regionalism and military growth.

FP369 Security Implications of Middle Eastern Political Systems (3-0-3). A comparative analysis of politics and institutions including foreign policy of Middle Eastern nations. The conflict of nations within this system and the world-wide effects are emphasized.

FP371 U.S. and Far Eastern Relations (3-0-3). An examination of the formulation and implementation of American foreign policy toward the major Far Eastern powers. Special attention is given to Japan, the Philippines, and Nationalist China.

FP411 Constitutional Law (3-0-3). A survey of the basic principles of the Constitution, particularly the civil and political rights of the individual, as determined by the Supreme Court. *Prereq.* FP110.

FP412 Elements of Law (3-0-3). The essentials

of the law of crimes, contracts, torts, agency, sales, security interests, real and personal property, negotiable instruments, insurance, corporations, wills, estates, trusts, taxation, and bankruptcy.

FP421 National Security Policy (3-0-3). Stresses the interaction of domestic, foreign and military considerations in the making and execution of national security policy. Case studies and national strategic estimates highlight the course.

FP484 Research Seminar (3-0-3). Each student, depending upon his area of interest within U. S. politics or international politics, pursues research directed by the instructor culminating in a major paper. *Prereq:* 1/C or permission of instructor.

FP491-2; FP493-4; FP495-6 Topics in Political Science (1-0-1) (2-0-2) (3-0-3). Courses with the instructor(s) may be taken in any area on an individual or small group basis. May also include courses offered by visiting professors or lecturers. *Prereq:* Approval of Department Chairman; FPA and FPI majors only.



Division of English and History

Department of English
Department of History

Department of English

English Major



The major program in English offers study of some of the most significant and influential writings of civilization from ancient times to the present, as well as the opportunity for independent study and for creative writing projects. A special feature of the program is that the literature of virtually all major countries and cultures is considered, in contrast to traditional offerings which are normally restricted to British and American literature.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP;

Mathematics: one mathematics elective;

Science: SP201, SP202;

Humanities/Social Sciences: HE300* and two elective courses;

Language: six semesters of a modern language;

Special: none;

Major: HE342 plus nine approved major electives.

* Taken during second class summer

English Courses

HE101 & HE102 Rhetoric and Discourse (2-2-3, 2-2-3). Review of grammar and rhetoric. Practice in writing each class meeting, with close supervision of correction and revision. Practice in the art of reading and the development of reader interest.

HE103 & HE104 Representative American Writers (3-0-3, 3-0-3). Emphasis on efficiency in oral and written communication and in reading based on major writings in American literature. Weekly themes. Conferences on composition. Social and

naval correspondence. Public speaking. Introduction to research techniques.

HE105 & HE106 Representative British Writers (3-0-3, 3-0-3). Emphasis on efficiency in oral and written communication and in reading based on major writings in British literature. Weekly themes. Conferences on composition. Social and naval correspondence. Public speaking. Introduction to research techniques.

HE113 & HE114 Modern Literary Types (3-0-3, 3-0-3). Emphasis on efficiency in oral and written communication and in reading based on modern short stories, novels, plays, and poetry. Weekly themes. Conferences on composition. Social and naval correspondence. Public speaking. Introduction to research techniques.

HE201-202 Projects in Reading and Writing (3-0-3). For selected midshipmen with exceptional aptitude in composition and literature. An opportunity to develop a talent in writing while following a coordinated reading program under tutorial supervision. *Prereq:* validation or completion of one year of 100-level English courses.

HE213 Chaucer and His Age (3-0-3). The "General Prologue," several of the Tales, and as much of *Sir Gawain and the Green Knight* as time permits. Background reading in the culture of medieval England, ca. 1325-1425. First semester, alternate years.

HE214 (HE215) Selected Major British Writers to 1800 (3-0-3). Concentration on the literature of the English Renaissance. Literary forms and ideas are illustrated by More's *Utopia*; poems of the courtier poets; Spenser's major poetry; Shakespeare's sonnets; and poems of the metaphysical and Cavalier poets of the early 17th Century. Second semester, alternate years.

HE216 (HE230) Twentieth Century British Literature (3-0-3). Readings in British literature from James Joyce and D. H. Lawrence to such contemporaries as William Golding and Anthony Burgess. Emphasis is on prose stylists, with some attention to major poets: Yeats, Eliot, and Auden. Second semester, alternate years.

HE217 The Romantic Movement (3-0-3). Detailed study of the art, ideas, and influence from history of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. A semester research project will explore one or more of the prose writers associated with the 1780-1830 period. First semester, alternate years.

HE218 Victorian Poetry and Prose (3-0-3). The poets Tennyson, Browning, Arnold, and Meredith and the novelists Dickens, Thackeray, Eliot, Hardy, and Moore dealt with many of the same social and sexual problems that occupy novelists of the present day. This course examines reasons why their treatments of these perennial themes were often compromises between honesty and pragmatism. Second semester, alternate years.

HE219 The English Novel, Fielding to Hardy (3-0-3). Covering the greatest period in the rise of popular fiction. Eight to ten novels, selected from among the works of such masters as Fielding, Austen, the Brontës, Dickens, Thackeray, Eliot, Trollope, and Hardy will be read, affording

abundant insight into the social history of the century preceding our own. First semester, alternate years.

HE221 Classical Literature (in translation) (3-0-3). Lecture-discussion course to help students appreciate the importance of ancient Greek and Latin epic, dramatic, and lyric poetry, the themes of which have continued to reappear in literature to the present day. The period covered is from the eighth century B.C. to the death of Ovid.

HE222 The Bible and its Literature (3-0-3). Studies in the Bible and its influence on European and American literature. Emphasis will be placed on modern Biblical literary-critical methodology and in the symbolic richness of derivative literature from Dante to Bernard Malamud. Second semester, alternate years.

HE223 Medieval Literature (3-0-3). Readings in masterpieces of Continental Europe from about 1100 to 1300. The course aims to acquaint the student with the continuing humane tradition as seen through eyes other than those of his own generation. *The Song of Roland. The Nibelungenlied, Aucassin and Nicolette, The Romance of the Rose*, the medieval troubadours and minnesingers, Sir John Mandevill's *Travels*, Norse saga materials, Dante's *Divine Comedy*, medieval drama, and some selections from the medieval philosophers. First semester, alternate years.

HE224 The Literature of the Continental Renaissance (3-0-3). Representative masterpieces of continental Renaissance literature: Erasmus' *In Praise of Folly*; Petrarch's *Sonnets*; Machiavelli's *The Prince, Discourses*, and *Mandragola*; Bruno's *The Candle Bearer*; Cellini's *Autobiography*; Castiglione's *Book of the Courtier*; various writers of the novella: Tasso's *Jerusalem Delivered*; Rabelais' *Gargantua and Pantagruel*; Montaigne's *Essays*; *Life of Lazarillo de Tormes*. Some attention to background materials in the arts. Second semester, alternate years.

HE240 American Black Literature (3-0-3). Provides an historical survey of American black literature from the Colonial period to the present. Major figures including Toomer, Hughes, Wright, Ellison, Baldwin, Baraka, and Brooks are stressed.

HE241 The 19th Century American Renaissance (3-0-3). Study in depth of major American writers in the period 1840-1860: Emerson, Thoreau, Poe, Hawthorne, Whitman, and Melville. First semester, alternate years. *Prereq:* 1/C and 2/C only.

HE242 Realism, Naturalism and Humor in the 19th Century (3-0-3). Study in depth of the major American realists (Howells, Clemens) and





naturalists (Crane, Norris, Dreiser) in the period 1800–1900. Second semester, alternate years. *Prereq: 1/C and 2/C only.*

HE243 (HE220) American Literature, 1900–1940 (3–0–3). Major American writers (Dreiser, Hemingway, Lewis, O'Neill) and major works in all genres from 1900 to the end of WW II. First semester, alternate years.

HE244 Contemporary American Writers (3–0–3). The development of American literature, 1940 to present. Poetry and drama are included but the main emphasis is on the development of the novel: John Barth, James Baldwin, Bernard Malamud, Mary McCarthy, Saul Bellow, Ralph Ellison, Sylvia Plath, Edward Albee. Second semester, alternate years.

HE250 Literature of the Sea (3–0–3). Study of the principal genres of the literature of the sea (an epic, novels, shorter fiction, poetry, and sea songs). Emphasis on literary merit, problems of command, situational ethics, and symbolism.

HE300 Public Communications (1–0–1). Indoc-trination in the junior officer's role in the Navy's public affairs program. Practice in speaking in various situations. Taken during 2/C summer.

HE312 The European Novel in the 19th and 20th Centuries (3–0–3). Novels of major European writers are read and discussed. Stendahl, *Red and Black*; Goncharov, *Oblomov*; Flaubert, *Madame Bovary*; Turgenev, *Fathers and Sons*; Dostoyevsky, *Crime and Punishment*; Zola, *Germinal*; Hesse, *Magister Ludi*; Solzhenitsyn, *Cancer Ward*.

HE321 Afro-Asian Cultures (3–0–3). Readings in traditional and modern literature of Africa, India, China, Japan, and other Eastern cultures. The traditions, customs, and aspirations of these cultures as revealed in their literature, and the relevance of this literature to our own times.

HE322 Modern Poetry (3–0–3). General theories of poetic technique, as particularly exemplified in the work of such "classic moderns" as Hardy, Yeats, Frost, Eliot, and Auden. The last third of the course emphasizes individual student critiques of selected contemporary poets of the 50's and 60's. *Prereq: 1/C and 2/C only.*

HE323 Drama: Classic to Early Modern (3–0–3). An introduction to the elements of drama and the theatre is followed by a study of several classic Greek dramas and their modern counterparts. The influence of Roman and Medieval conventions on Renaissance and Elizabethan drama is analyzed. Restoration, neo-classic, romantic, and early realistic dramas are examined.

HE324 Modern Drama (3–0–3). A detailed study of late nineteenth century realism and naturalism and the major works of Ibsen, Strindberg, Shaw,

and Chekhov is followed by an examination of expressionist and absurdist dramas by Pirandello, Lorca, Brecht, Beckett, Ionesco, and Pinter. The works of several American playwrights, including O'Neill, Williams, Miller, and Albee, are evaluated.

HE332 The Modern Tradition (3–0–3). Ideas and modes of thinking which have shaped and determined the contemporary consciousness and contemporary attitudes, as reflected in the literature of our times; for example, psychoanalysis, existentialism, new theologies, archetypal criticism, space science, and cultural anthropology. *Prereq: 1/C or 2/C only.*

HE333 Shakespeare and his Age (3–0–3). About a dozen plays of Shakespeare are given a close, critical reading, with selection from each of the major dramatic types (history, tragedy and comedy). Plays by major contemporaries of Shakespeare. Fall term, alternate years. *Prereq: 4/C Writing Tutorial.*

HE334 (HE432) Milton and his Age (3–0–3). Consists of a close and careful reading of all of Milton's major poetry and some of his minor poetry. Some of Milton's important prose is also read and discussed. Second semester, alternate years. *Prereq: 4/C Writing Tutorial.*

HE341 The English Language and General Linguistics (3–0–3). Development of English from Anglo-Saxon times to the present, tracing external influences. Introduction to the study of the nature, structure, and universality of all language; phonology, phonetics, phonemes, and transformational grammar. *Prereq: 4/C Writing Tutorial.*

HE342 (HE484) Introduction to Literary Criticism (3–0–3). Encompasses the vocabulary of literary analysis and the theory and practice of literary criticism. The approach is eclectic and concentrates on what critical approach can yield to the reader in the way of deeper understanding and satisfaction from the work of art. Offered each spring. **REQUIRED OF ALL ENGLISH MAJORS.** *Prereq: 4/C Writing Tutorial.*

HE410 Readings in Western Ideas (3–0–3). Reading and seminar discussion of western masterpieces from *The Epic of Gilgamesh* through the existentialists. In 1972–73 the course theme was "Man on a Quest" and the reading included works by Shakespeare, Sophocles, Dante, Voltaire, Goethe, Nietzsche, Dostoyevsky, Camus, Ibsen, Lorca, Hesse, Joyce, Kosinski, Kafka, Nin, Anouilh, Jung, Erikson, Olesha, Beckett, Borges and Marquez. Keeping of journals is encouraged.

HE421 Creative Writing (3–0–3). Course begins with exercises in plot, character, tone, and disciplined verse. Students then decide which genre they wish to work in. Class meetings thereafter are free discussions of work-in-progress, with

students criticizing one another's papers. *Prereq: 1/C only, with permission of instructor.*

HE422 Independent Studies in Literature (3-0-3). Student suggests extensive reading in a major writer, period, or genre (the Russian novel, Greek mythology, Elizabethan drama) and once instructor's permission has been obtained, begins his work, culminating in an extensive written report. Weekly consultation with instructor is required. *Prereq: 1/C only.*

HE481 Seminar in Representative Contemporary Novelists (3-0-3). Sixteen American and European novels on issues current in the last four decades are studied. Examples: Faulkner, *Sanctuary*; Camus, *The Stranger*; Hesse, *Demian*; Kerouac, *On the Road*; Nabokov, *Pale Fire*; Kesey, *One Flew Over the Cuckoo's Nest*; Brautigan, *Trout Fishing in America*. *Prereq: 1/C only, or permission of instructor.*

HE482 Seminar in Contemporary Playwrights (3-0-3). Modern drama—American, British, and Continental—as representative of contemporary points of view on political, social, and ethical problems. *Prereq: 1/C only, or permission of instructor.*

HE493 Seminar in Faulkner (3-0-3). Nine novels plus major short stories are read: *The Unvanquished*, *Sartoris*, *The Hamlet*, *The Mansion*, *Sanctuary*, *Light in August*, *Absalom! Absalom!*, *As I Lay Dying*, *Intruder in the Dust*, *The Portable Faulkner*. Major Faulkner critics are read. First semester, alternate years. *Prereq: 1/C only; 2/C and 3/C with permission of instructor.*

HE486 (HE412) Seminar in Classic American Writers (3-0-3). An intensive study of one or two of the major American authors of the 19th Century (Emerson, Thoreau, Poe, Hawthorne, Melville, Mark Twain, and Henry James). Emphasis on literary merit, technique, structure, and thematic analysis. *Prereq: 1/C or 2/C only.*

HE487 Seminar in a Genre or Special Topic (3-0-3). *Prereq: 1/C only, or permission of instructor.*

HE490 Pedagogy in English (3-0-3). Experience in leadership and in techniques of education and training through teaching a section of a Fourth Class Writing Tutorial under advisory supervision of a member of the staff of the Department of English. Limited to three 1/C English majors per semester.



Department of History

History Major

The major in History concentrates upon the development of the important civilizations, societies, and states of the world. The knowledge of historical evolution that is acquired will contribute significant perspective and maturity to the understanding of the great crises and confrontations of today's world and to a more acute awareness of the institutions and values at issue. The program provides a basic historical background as well as the opportunity for specialized study in the fields of American, European, non-Western, naval, and military history.

Curriculum Requirements (In addition to the requirements of plebe year)

Professional: NN201, NN202, EN200, EN301, EW301, EE311, EE312, NS300*, NS302, NL302, NL451, ES400, and NS452 or NL454 or NPP.

Mathematics: one elective;

Science: SP201 and SP202;

Humanities/Social Sciences: HE300* and two elective courses;

Language: six semesters of a modern language;

Special: none;

Major: Nine approved history electives (including Naval History) and HH482.

* Taken during second class summer



History Courses

HH101 History of Sea Power I (3-0-3). A study of the development and influence of sea power and the naval profession from the beginnings in the Mediterranean to World War II. *4/C only.*

HH102 History of Sea Power II (3-0-3). A continued study of the development and influence of sea power and the naval profession from the origins of World War II to the present. *Prereq: HH101.*

HH110 Non-Western Civilization (3-0-3). Provides an introduction to the civilizations and current problems of the Far East, Southeast Asia, South Central Asia (India), the Middle East, and Africa.

HH120 Contemporary American Society (3-0-3). An examination of American life, primarily in the years since World War II, emphasizing the impact of major economic, social, and political developments on the quality of society.

HH127 Western Civilization to 1500 (3-0-3). Surveys the development of political, economic, and social institutions and the intellectual and cultural attainments of Western civilization, chiefly of Greece, Rome, and Medieval Christendom.

HH128 Early Modern Europe, 1500-1789 (3-0-3). Surveys the Renaissance, the religious and scientific revolutions, the development of national states, commercial capitalism, absolute monarchy, constitutional government, the Enlightenment and the origins of the French Revolution.

HH130 Europe Since the French Revolution (3-0-3). European civilization during the period when the major European states experienced revolutionary economic, political, and social transformation and exercised world-wide power. Scientific, intellectual, and cultural developments of the period are also studied.

HH140 Western Cultural Heritage (3-0-3). An introduction to the major epochs of Western development in the fine arts, this survey examines the evolution of contemporary painting, sculpture, architecture, and music as well as the individuals and societies that produce them.

HH210 United States Economic History (3-0-3). A study of the American economy from colonial times to the present, emphasizing the interrelationship between techniques of making a living and the nation's social and political attitudes.

HH211 United States History to 1865 (3-0-3). A history of the United States from its colonial origins through the Civil War, emphasizing the formation and development of its political, social, economic, and religious institutions.

HH212 United States History Since 1865 (3-0-3). A history of the United States since the Civil War. Emphasis is on the development of national power through an examination of political, social, and economic institutions.

HH220 A Survey of Black History and Culture (3-0-3). A survey of the progress of the black American from his origins to the present. The course identifies the stereotyped views of past Negro life and presents an understanding of the Black Experience.

HH222 History of Latin America (3-0-3). The impact of Europe in the colonial period, the independence struggle, the rise of national states, and the interplay of world forces upon the shaping of 20th century Latin American life.

HH230 Introduction to Philosophy and Logic (3-0-3). A survey of Western secular philosophy based on readings in representative philosophers; the basic problems of philosophical inquiry and a variety of solutions to them; principles of logic.

HH232 Ethics (3-0-3). A critical examination of systems of values and standards, with a discussion of current moral issues.

HH233 Cultural Anthropology (3-0-3). Introduction to the study of man and the effects of culture on him and him on culture. The historical background of culture and a critical analysis of the concepts of cultural evolution and physical evolution are pursued. Included are topical studies of the components of culture such as marriage and religion.

HH321 Muscovite and Imperial Russia (3-0-3). A study of Russian history from the founding of Moscow to 1917, examining the domestic and external forces responsible for shaping the structure of Russian society and culture.

HH322 Soviet History and Contemporary Problems (3-0-3). An examination of the Revolution of 1917 and the development of the Soviet Union, emphasizing the institutions and policies adopted to meet domestic and foreign problems.

HH324 Modern France and the Overseas Empire (3-0-3). French domestic and imperial history since the Revolution of 1789, with emphasis on the period since 1870. The role of France as a European and world power will also be investigated. Offered alternate years. *Prereq: HH130.*

HH333 American Diplomacy to 1900 (3-0-3). Historical development of the basic United States diplomatic relations from the Revolution to 1900, stressing fundamental principles and forces which by 1900 created a distinctive American foreign policy.

HH334 American Diplomacy in the Twentieth Century (3-0-3). An analysis of American foreign policy from continentalism to global responsibility, emphasizing the impact of imperialism, World Wars I and II, the Cold War, and the Vietnam crisis.

HH336 Philosophy of Religion (3-0-3). Philosophical analysis of the central concepts and problems of the Judaeo-Christian tradition. The nature of religion, faith, God, evil, and immortality examined from Plato through the death-of-God theologians. *Prereq: HH230 or HH232 or permission of instructor.*

HH340 Philosophy of Science (3-0-3). An examination of the impact of science on twentieth century society, the values assumed by science, and the nature of scientific discovery and experimentation. *Prereq: 1/C or 2/C only, or permission of instructor.*

HH342 Modern European Revolutions (3-0-3). The three great European revolutions of 17th-century England, 18th-century France, and 20th-century Russia, with emphasis upon the comparative approach. *Prereq: HH128 or HH130 or permission of instructor.*

HH344 Imperialism (3-0-3). A study of the changing sources, theories, and forms of imperialism and of the manner in which it has influenced the course of international relations from 1870 to the present. Offered alternate years. *Prereq: HH130 or permission of instructor.*

HH351 Modern History of China and Japan (3-0-3). An analysis of contemporary Asian problems which considers their cultural and institutional origins, their 19th-century development under the impact of Western influence, and their culmination in contemporary Asian nationalism.

HH362 History of the Middle East (3-0-3). A long range historical approach to the Middle East's role in world affairs and the development of its cultural, political, and military institutions. Emphasis is placed on strategic and diplomatic considerations.

HH372 Philosophy of War Colloquium (3-0-3). Surveys ethical and operational problems, as well as causes and nature of war; examines civil-military relationships and analyzes key writings in the field. *Prereq: 2/C only, or permission of the instructor.*

HH411 Military History and Policy of the United States (3-0-3). A survey from 1760. Analyzes major campaigns, logistic problems, implementation of national policy, relationship between military staffs and civil governments, the effect of airpower, and nuclear concepts. *Prereq: HH372 or 1/C, with permission of instructor.*

HH422 American Colonial History (3-0-3). The origins of American civilization from the Age of Discovery to 1776. Emphasis is placed upon the founding of the colonies and their institutional development.

HH424 United States History, 1877-1914: Emergence of the Modern Nation (3-0-3). An examination of the political, economic and social developments from the end of Reconstruction to World War I which contributed to the development of

the United States as a great power. *Prereq: HH211 or HH212 or permission of instructor.*

HH426 The Renaissance and Reformation (3-0-3). A study of the transformation which began in Italy in the 14th century and spread throughout Europe. The development of the Protestant Churches and the reform of the Catholic Church are given particular attention. Offered alternate years. *Prereq: HH128 or permission of instructor.*

HH428 Europe in the Nineteenth Century (3-0-3). A survey of the intellectual, economic, political, and diplomatic changes which helped to establish Europe as the world's most successful culture. Offered alternate years. *Prereq: HH130 or permission of instructor.*

HH429 Recent United States History (3-0-3). An explanation of political, social and economic developments since World War I, emphasizing the Era of Normalcy, the New Deal, and World War II and its aftermath. *Prereq: HH212 or permission of instructor.*

HH431 Europe in the Twentieth Century (3-0-3). Recent European history, stressing the diplomatic relations of the era and the influence of ideologies on European politics and war. *Prereq: HH130 or permission of instructor.*

HH452 Recent Germany and Eastern Europe (3-0-3). An analysis of the impact of Germany and the Soviet Union on East-Central Europe since 1919 and the response within the area to these predominating powers. *Prereq: HH130 or permission of instructor.*

HH460 War and Society in the Twentieth Century (3-0-3). An historical and sociological analysis of war and military affairs. Political and economic aspects, revolutionary technology, strategic philosophies and defense policies, and civil-military relations in democratic and totalitarian states will be studied. *Prereq: HH310 or HH101 and HH102 or permission of instructor.*

HH462 Russian Military and Naval Doctrine (3-0-3). The evolution of Russian strategic and tactical concepts; the interrelationship of armed services; the development of material, education and training; and illustrative campaigns. Reading knowledge of Russian is desirable. *Prereq: 1/C only, or permission of instructor.*

HH472 Philosophy of History (3-0-3). Readings in and discussions of major historians. The role of the historian, the theories and schools of history, and the landmark historical works are examined. *Prereq: 1/C only, or permission of instructor.*

HH482 Research Seminar in History (3-0-3). This seminar meets in three different sections: United States, European, and Naval. Research methodology is studied, and a substantial research paper is written. *Prereq: History major or permission of instructor.*





VIII. Professional Training Courses

The Commandant of Midshipmen directs the Academy's professional training program, which is a vital part of each midshipman's development during his four years at the Academy. It includes instruction, drills, and practical training conducted during the academic year, as well as summer training conducted away from the Academy with Fleet operational and training units.

Midshipmen are graded on their interest and performance in the professional program just as they are on their performance in the academic program. A midshipman's over-all standing within his class at graduation depends very significantly on his grades in professional training.

An outline of the professional training program follows.

Fourth Class Summer

Introduction to Seamanship. Practical instruction in elementary seamanship, sailing in knockabouts and yawls, rules of the nautical road, and visual signalling.

Physical Education Orientation and Indoctrination. Preliminary examinations in swimming, posture, and athletic ability. Physical education drills in fundamentals of swimming, boxing, wrestling, posture, and personal conditioning. Indoctrination drills in lacrosse, fencing, soccer, rugby, gymnastics, crew, golf, tennis, squash racquets, and track.

Small Arms. Practical instruction in nomenclature, field stripping and assembly of small arms. Firing of service rifle and pistol. Midshipmen who qualify are awarded the Navy Expert Rifleman and/or Pistol Medal.

Orientation and Indoctrination. A course designed to orient the new midshipman to the Naval Academy and to the naval service, and to indoctrinate him in the way of life at the Naval Academy, including his duties as a midshipman, and the Academy's mission, ideals, standards, traditions, and customs.

Fundamentals of Naval Hygiene. The fundamentals of personal hygiene, including mental and physical hygiene, and first aid.

Fourth Class Year

PE101 & 102 Physical Education. Instruction in the fundamentals of swimming, boxing, wrestling, gymnastics, soccer, golf, tennis, volleyball, basketball, handball, squash racquets,











and personal conditioning. Tests in applied strength, mile run, swimming, boxing, wrestling, gymnastics, and on the obstacle course.

Infantry Drill. Two hours per week of infantry drills and dress parades for eight weeks during both the fall and spring.

Naval Orientation. During the winter months, two hours of instruction per week on various topics concerning leadership, human relations, and the naval establishment.

Third Class Summer

P201 At-Sea Training. During summer at-sea training with the Fleet, the third classman is introduced to Navy life at sea, to shipboard organization and relationships, and to the leadership opportunities and problems of a junior officer. In addition to ship's company officers, his instructors include officers and first class midshipmen from the Naval Academy. He actively participates in a wide range of shipboard tasks and evolutions under normal and emergency conditions, both at sea and in port. He stands deck and engineering watches and becomes familiar with shipboard equipment. He is required to take a comprehensive examination at the completion of his training period.

Third Class Year

PE201 & 202 Physical Education. Continuation of instruction in swimming, boxing, and wrestling. Instruction in the basics of judo. Tests in applied strength, mile run, swimming, boxing, and on the obstacle course.

Infantry Drill. Two hours per week of infantry drills and dress parades for eight weeks during both the fall and spring.

Naval Orientation. During the winter months, two hours of instruction per week on various topics concerning leadership, human relations, and the naval establishment.

Second Class Summer

Aviation, Submarine, Surface Line, and Marine Corps Orientation. Broad professional training in aviation, submarines, surface line, and the Marine Corps at bases away from the Naval Academy. In addition, during second class summer, each midshipman completes four weeks of professional academic training at the Naval Academy: NS300 Operations and Tactics I (2-2-3), and HE300 Public Communications (1-0-1).

Second Class Year

PE301 & 302 Physical Education. Advanced instruction in swimming, the principles of personal conditioning, officiating, and the principles of hand-to-hand combat. Electives in handball, squash and volleyball. Tests in applied strength, swimming, mile run, and on the obstacle course.

Infantry Drill. Two hours per week of infantry drills and dress parades for eight weeks during both the fall and spring.

Naval Orientation. During the winter months, two hours of instruction per week on various topics concerning leadership, human relations, and the naval establishment.

First Class Summer

P400 At-Sea Training. During his second and last summer of at-sea training with the Fleet, the first class midshipman undertakes the duties of a junior division officer, handling the administrative responsibilities and standing the watches of a junior officer. He assists in the training of the third class midshipmen assigned to his ship. He completes a considerable amount of practical work in navigation, taking sights and determining the ship's position. Among references used during his training are the *Watch Officer's Guide*, the *Division Officer's Guide*, and the *Ship's Organization and Regulations Manual*. He is required to complete a cruise training journal, summarizing his watches and his work in engineering, seamanship, navigation, weapons, operations, and in basic tactics. His cruise journal is graded, and he takes a comprehensive examination on his at-sea training upon return to the Naval Academy. He receives both an academic grade and an aptitude grade for his summer's training.

First Class Year

PE401 & 402 Physical Education. Instruction in advanced swimming, personal conditioning, and athletic administration. Tests in applied strength, running (mile run), swimming, and on the obstacle course. Electives in squash racquets, tennis, golf, handball, volleyball, and personal defense.

Infantry Drill. Two hours per week of infantry drills and dress parades for eight weeks during both the fall and spring.

Naval Orientation. During the winter months, first classmen become instructors, presenting to the underclassmen, via lectures and discussion groups, the professional knowledge and the perspectives they have gained during their more than three years as midshipmen.





IX. Varsity and Intramural Athletics

Just as the Naval Academy has a responsibility for the professional and intellectual development of midshipmen, so, also, must it fulfill its responsibility for their physical development. The late John Fitzgerald Kennedy, a World War II naval officer who rose to the highest office in the land, underscored the importance of athletics generally in his thoughts about football: "I sometimes wonder whether those of us who love football fully appreciate its great lesson: that dedication, discipline, and teamwork are necessary. We take it for granted that the players will spare no sacrifice to become alert, strong, and skilled, that they will give their best on the field. This is as it should be, and we must never expect less, but I am extremely anxious that its implications not be lost upon us."

In the competitive arena that is intercollegiate athletics, the exploits of Navy athletes are well-chronicled. Midshipmen have carved an outstanding reputation in 21 sports from football to fencing, sailing to squash, and golf to gymnastics.

Two Navy football players—halfback Joe Bellino and quarterback Roger Staubach—won the Heisman Trophy, the college gridiron's most coveted individual prize, within a period of four years.

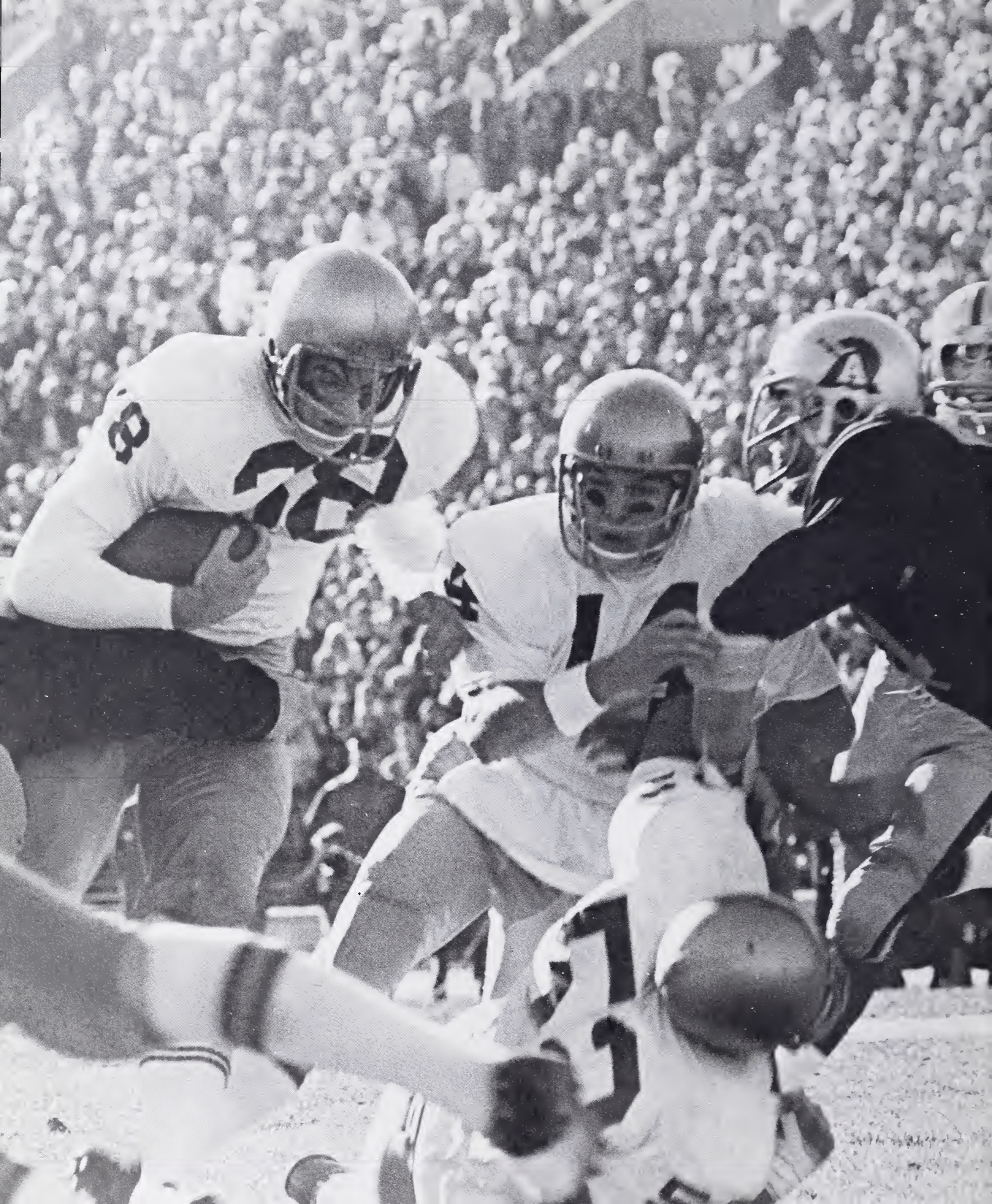
Navy heavyweight crews captured the Olympic gold medal for eight-oared shells at Antwerp, Belgium in 1920, and in Helsinki, Finland, in 1952.

From 1960–67, the Navy lacrosse team reeled off eight consecutive national championships, a feat unparalleled in the history of that sport. They were again champions in 1970.

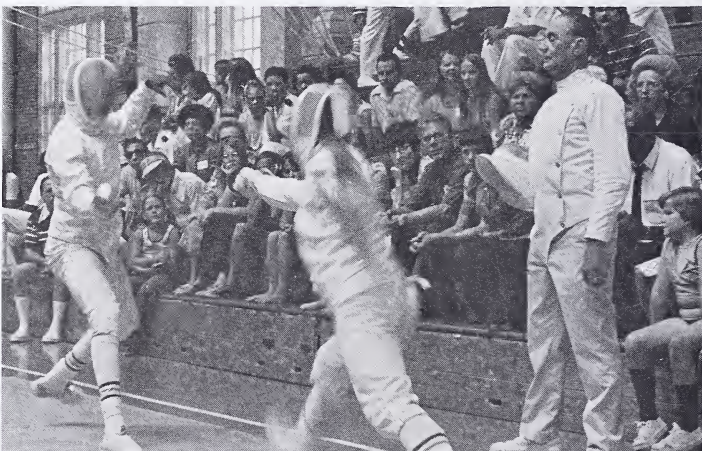
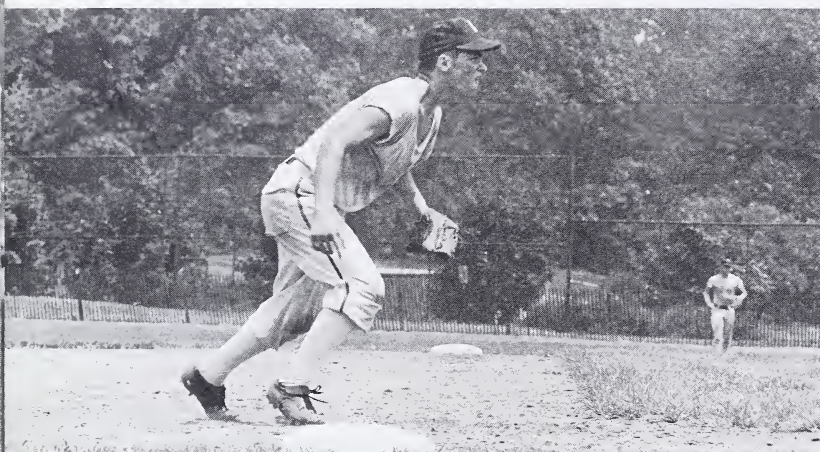
Over a recent six-year, 48-game span, the Navy soccer team did not drop a regular season contest.

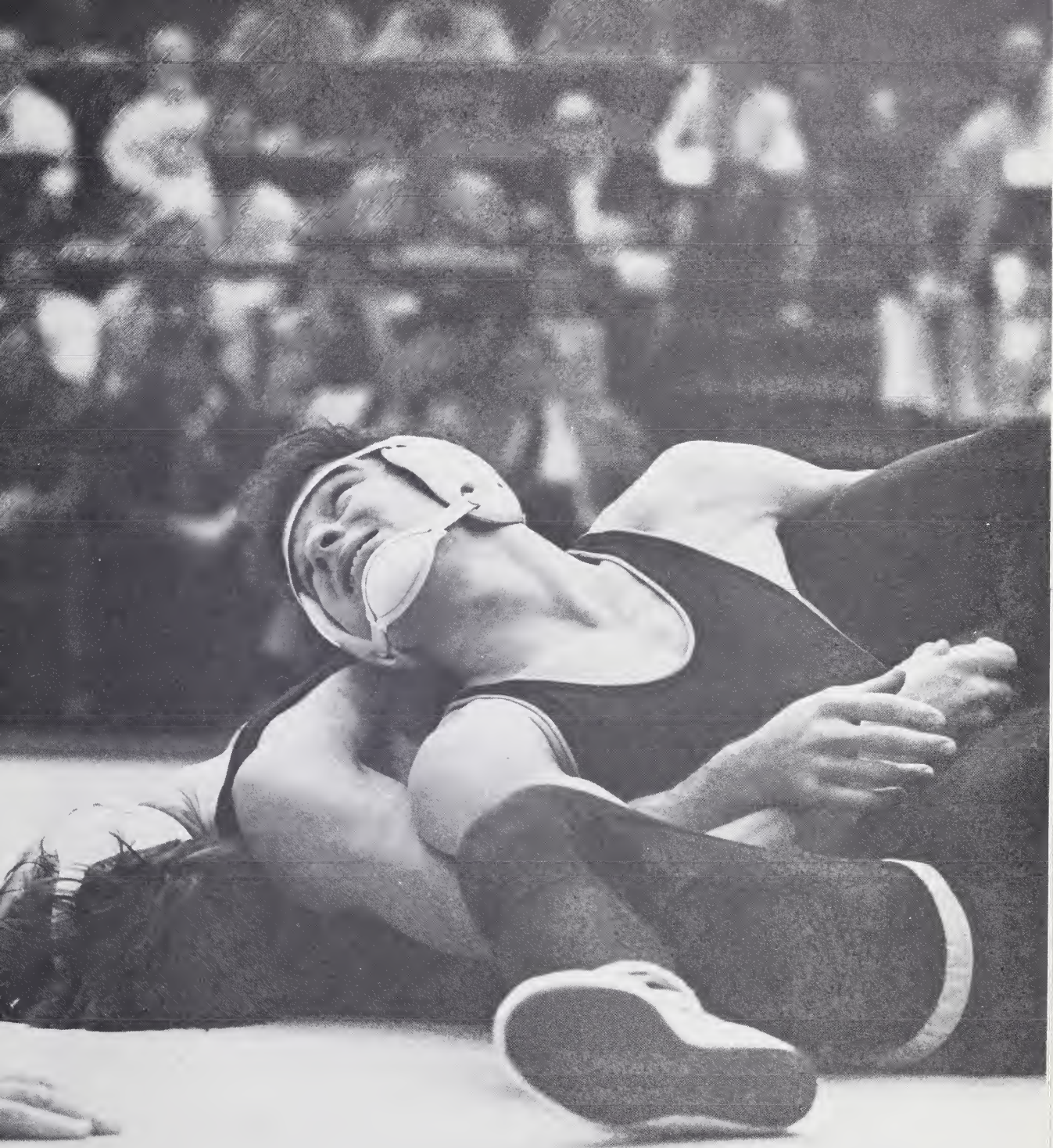
And, a former Navy oarsman—Alan B. Shepard—was America's first man in space.

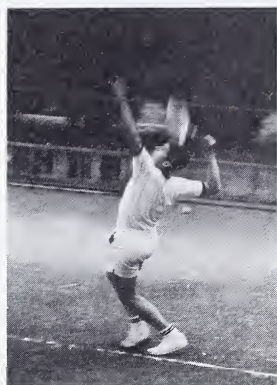
Through the intercollegiate program, one of the largest in the nation, and an intramural schedule that is equally ambitious, the Naval Academy fulfills











its responsibility for the physical development of midshipmen. Academy athletics are big, nationally known and respected, and put a high premium on excellence.

Football at the Naval Academy dates from 1879, just 10 years after Rutgers and Princeton introduced the sport at New Brunswick. The midshipmen have been to four bowl games, and nothing better symbolizes the Naval Academy athletic program than the Army-Navy football game, a sports event in the same galaxy as the World Series, the Kentucky Derby, and the Rose Bowl.

There is enough of a variety in Navy's intercollegiate lineup to satisfy virtually everyone's athletic tastes. In the fall, there is football, cross country, soccer, 150-pound football, and sailing. Winter is the most active time of year with nine different sports in season—basketball, fencing, gymnastics, pistol, rifle, squash, swimming, track, and wrestling. The spring schedule includes baseball, heavyweight crew, lightweight crew, golf, lacrosse, sailing, tennis, and track.

Army traditionally is Navy's top opponent and the service rivals clash in a total of 18 engagements during the athletic year. Annapolis teams also face the perennial collegiate strongboys in every sport—Notre Dame in football, Columbia and New York University in fencing, Penn State in gymnastics, Harvard and Pennsylvania in crew, and Yale in swimming.

But perhaps even more a part of Annapolis life is the competition within the Brigade represented by the intramural sports program. Every midshipman, with the exception of varsity athletes, must take part. Here all can participate, each at a level equal to his athletic ability. Intramural sports include:

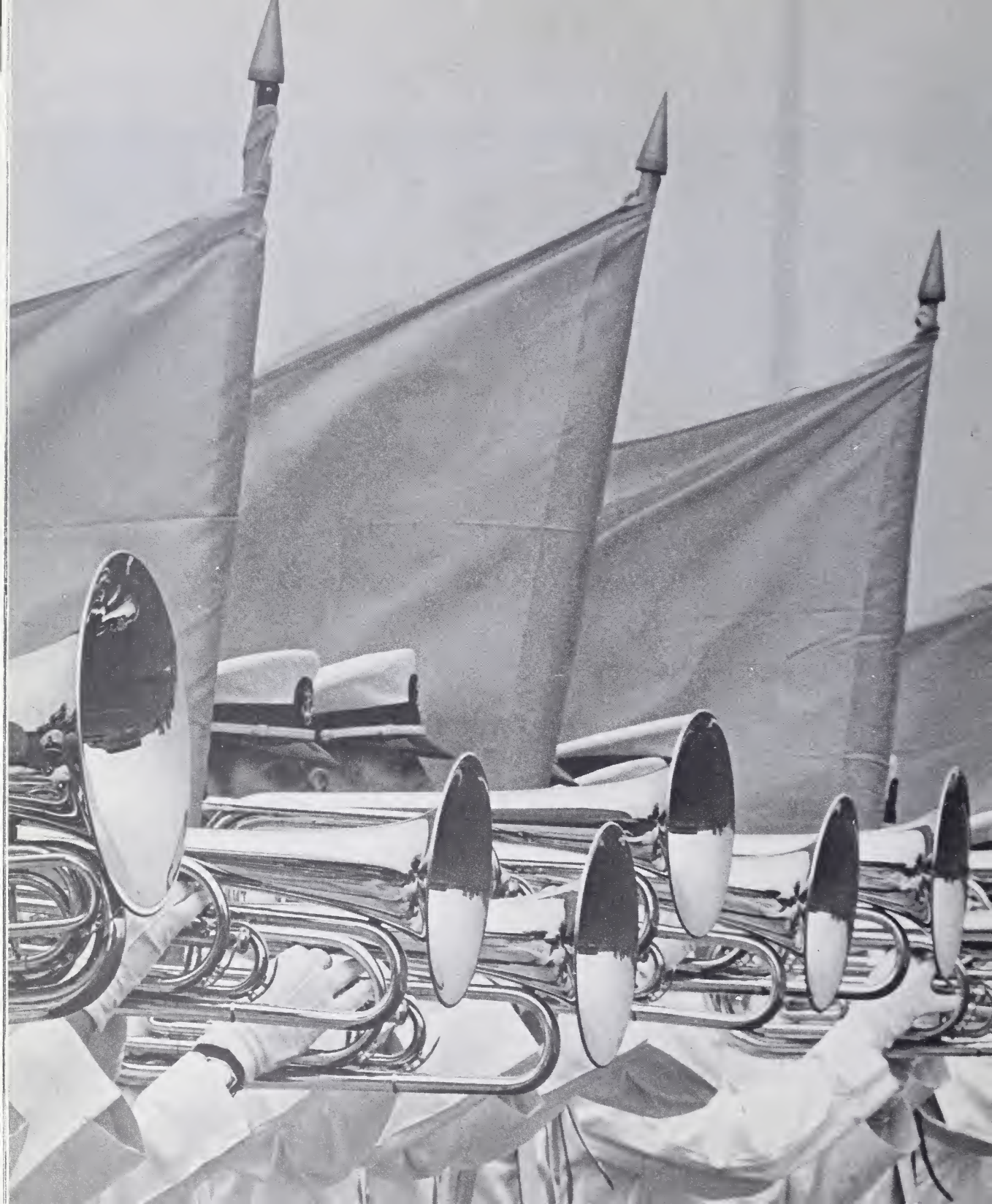
Basketball	Knockabout Sailing	Tennis
Boxing	Lacrosse	Touch Football
Crew	Rugby	Track
Cross Country	Soccer	Volleyball
Fencing	Softball	Water Polo
Field Ball	Squash	Weightlifting
Football	Swimming	Wrestling
Handball	Team Handball	

Excellent physical facilities support the program. Navy-Marine Corps Memorial Stadium, seating 28,000 fans between the goal lines, was dedicated in

1959. Halsey Field House is surfaced throughout with Tartan and includes a 220-yard indoor track. There are more than 100 acres of lighted playing fields, a superb indoor swimming pool, a 5,000-seat baseball park, a challenging 6,217-yard championship golf course, and an impressive sprawl of tennis, squash, handball, and badminton courts. A new, Astro-turf field provides an all-weather practice area for football, lacrosse, and soccer, and a just-completed indoor skating rink provides for hockey and other skating activities.

The athletic program is administered by the Naval Academy Athletic Association, a non-profit organization headquartered in Annapolis. The Association arranges the varsity schedules and provides coaching staffs and equipment.





X • Extracurricular Activities

Life at the Academy offers midshipmen a wide-ranging choice of over 65 different extracurricular activities which they organize and maintain themselves—everything from a Big Brother program to social clubs to music groups to professionally oriented programs.

Like music? There is a Glee Club, the Antiphonal Choir, the Protestant and Catholic Chapel Choirs; the Drum and Bugle Corps, Concert Band, five separate combos which provide a lively variety of music for informal dances and other events, and the NA-10—the ever-popular dance band of the Brigade of Midshipmen.

Interested in writing? Members of the Brigade publish the *Lucky Bag*, the yearbook for each class; the *Trident* magazine, a literary and professional publication; the *Log*, a less serious and more typical campus humor magazine; the *Trident Calendar* booklet, embellished by photographs and cartoons; and *Reef Points*, a pocket size guide to Academy and Navy organization, lore, and customs for the plebes.

The theater? Dramatic activities include the Masqueraders and the Musical Club and their supporting groups—the Stage, Makeup and Property, and Juice (electrical) Gangs. Others may find interest in such organizations as the Photographic Club, Amateur Radio Club, Scuba Club, Art and Printing Club, Brigade Activities Committee, Public Relations Committee, or Radio Station WRNV, the “Voice of the Brigade.”

A wide variety of academically and professionally oriented activities is offered for midshipmen whose interests lie in this direction—the local chapter of the American Institute of Aeronautics and Astronautics for the future aviator, astronaut, or paper airplane designer; Sigma Pi Sigma, the Physics Honor Society; and the USNA branch of the Marine Technology Society, or more simply put, the Oceanography Club.

Sailing at the Academy has a serious professional purpose. The program is extensive and varied. There is sailing for every taste—from basic instruction to ocean racing, and from leisurely afternoon cruising to the keen competition of high-performance racing dinghies.











Skills and knowledge of seamanship and the sea gained under sail are the same basic skills and knowledge which have been used by seamen for centuries. They are as relevant in bringing a ship safely home to port today as they ever were. Thus, by developing better seamen, the Academy's sailing program contributes to the development of better naval officers.

Sailing is easily the most popular extracurricular activity at the Academy, with almost 1,000 midshipmen engaging in competitive or recreational sailing. And, judging by the activity along the seawall on weekends, sailing is equally popular with drags (dates).

The Academy has one of the finest sailing fleets in the world, including boats ranging from the 54-foot ocean racing sloop *Rage* and the 50-foot sloop *Outrage* to 12-foot Interclub dinghies. Basic sail training for all midshipmen is carried out in a fleet of twelve 44-foot Luders-designed fiberglass yawls and thirty 24-foot converted Rainbow-class knockabouts. After plebe summer, all sailing becomes voluntary and is carried on as a recreational activity as well as a varsity sport.

The midshipmen compete in intercollegiate events across the nation during the fall and spring. In support of the teams, the Academy maintains thirty 420-class racing dinghies and five 30-foot Shields-class sloops.

The Academy sponsors numerous intercollegiate and Chesapeake Bay regattas. Both the McMillan Cup and the John F. Kennedy Memorial Regattas are hosted by the Academy in the yawls. During the summer, the larger yachts are sailed in the open sea in such races as the Transatlantic, the Bermuda, and the Annapolis-Newport races. Other races include the Gibson Island Yacht Squadron Race to Cape May, the Chesapeake Lightship Race, the Cape May to Newport Race, the Marblehead-Halifax Race, and the Buenos Aires to Rio de Janeiro Race. Midshipmen skipper the yachts in Bay races and serve as crew members in ocean races.

Intercollegiate sailing is conducted by the Naval Academy Athletic Association. Other sailing is administered by the Naval Academy Sailing Squadron, an organization of officers, civilian faculty members, and other devotees of sailing. Besides being highly popular, Squadron-arranged weekend sailing trips give midshipmen a welcome chance to carry the spirit of the Navy to nearby ports on the Chesapeake Bay.

The Naval Academy Yard Patrol Squadron is organized for midshipmen who desire more extensive training afloat. This voluntary training supplements the curriculum at the Academy and summer training with the Fleet. The Squadron consists of six 80-foot YP craft, one being assigned to each battalion.

The organization and practices of the YP Squadron are very similar to those of Fleet destroyer squadrons on duty around the world. The midshipmen officers are selected for their ability to fulfill command positions. The midshipman selected as squadron commodore is responsible for the over-all performance and excellence of the Squadron, including the co-ordination of training, proficiency competition, inspections, and cruises. Midshipmen assisting him include a chief staff officer, two division commanders, and an administration officer. Completing the staff is an engineering officer who supervises training in engineering and who ensures that engineering equipment is operated and maintained properly. Each yard patrol craft is commanded by a first or second classman who is assisted by a 20-man crew composed of midshipmen from all classes.

Training is serious business during the week. Crews get underway on Tuesday, Thursday, and Friday afternoons. In addition to weekday training sessions, weekend cruises are conducted to Washington, Norfolk, Philadelphia, and to various Chesapeake Bay ports.

Competition between YPs for the Battle Efficiency Pennant is keen. The crew adjudged most proficient overall in tactics, deck seamanship, piloting, communications, and engineering is declared the winner for the year.

For those with a particular interest in the humanities, there are the Language Clubs and the Forensic Society. An annual spring highlight is the Naval Academy Foreign Affairs Conference, which draws together college students from across the country to discuss problems of a specific geographic area of the world.

These activities offer a midshipman a wide choice for professional enrichment, leisure-time enjoyment, and just plain fun.





XI. Administration, Staff, and Faculty

The administration of the Naval Academy is in many respects analogous to that of any college. A Board of Visitors performs the broad supervisory functions of a board of trustees. The Superintendent, a flag officer of the Navy, is the equivalent of a college president, and acts as the executive head of the Academy. He is assisted by the Commandant of Midshipmen, whose function is somewhat like that of a dean of students; the Academic Dean; and an administrative staff. The Superintendent, the Commandant, the Academic Dean, and other senior members of the faculty comprise the Academic Board, which makes major academic decisions and sets the academic standards for the Academy. Military, professional, and physical training come under the Commandant. The Academic Dean heads the academic program. Today's 600-man Naval Academy faculty is an integrated group of officers and civilians in approximately equal numbers. The officers, rotated at intervals of about three years, provide a continuing input of new ideas and experience from the Fleet. The civilians provide a core of professional scholarship and teaching experience, as well as continuity to the educational program.

The Board of Visitors

A Board of Visitors to the Academy, appointed annually, consists of the chairman of the Committee on Armed Services of the U.S. Senate, or his designee; three other members of the Senate designated by the Vice President of the United States or the President *pro tempore* of the Senate, two of whom are members of the Committee on Appropriations of the Senate; the chairman of the Committee on Armed Services of the U. S. House of Representatives, or his designee; four other members of the House of Representatives, two of whom are members of the Committee on Appropriations of the House of Representatives; and six persons designated by the President of the United States.

The Board meets at least once, but usually twice, each year at the Naval Academy to inquire into the state of morale and discipline, the curriculum, instruction, physical equipment, fiscal affairs, academic methods, and related matters, and submits a written report of its action and its views and recommendations to the President of the United States.



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The Academic Advisory Board was formed by the Secretary of the Navy to advise the Superintendent concerning the Academy's academic program. Meetings are held periodically during the year.

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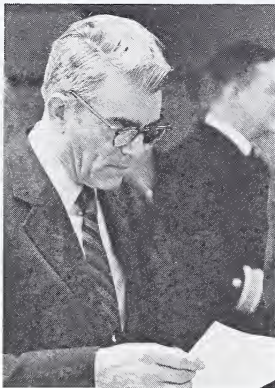
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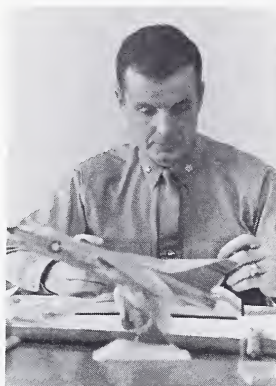
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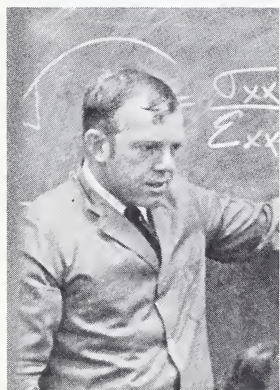
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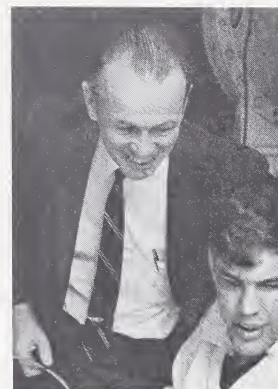
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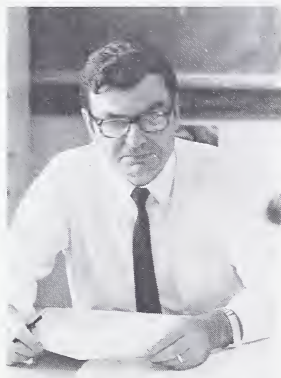
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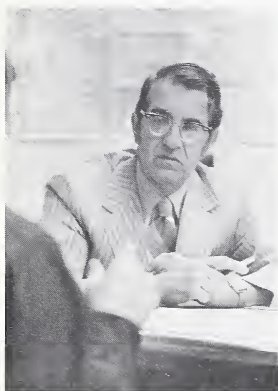
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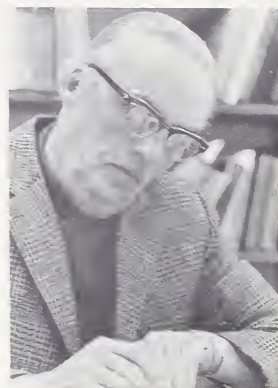
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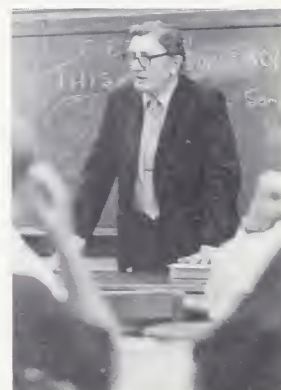
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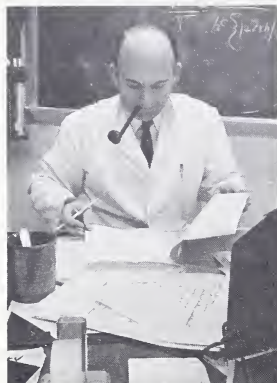
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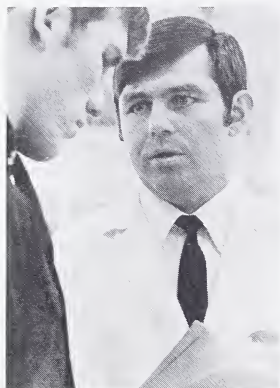
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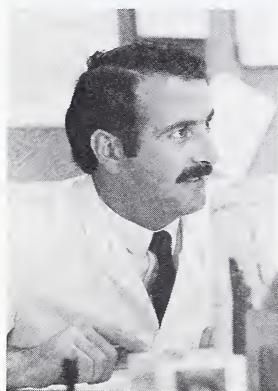
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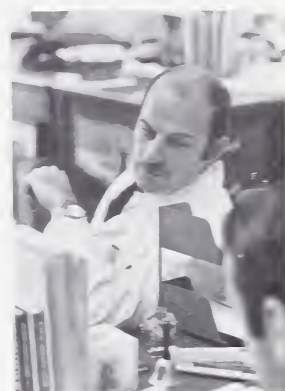
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 Patrick X. de La Rochebrochard, Lieutenant Commander, French Navy; École Navale
 Daniel T. Y. Lee, Assistant Professor; LL.B., Soochow University Law College
 Claude P. Lemieux, Professor; M.A., Middlebury College
 Bruno S. Lepori, Lieutenant Commander, Italian Navy; Italian Naval Academy
 René F. Muller, Professor; M.A., Columbia University
 Gilberto Novelo, Lieutenant, Mexican Navy; B.S., Mexican Naval Academy
 C. Albert Pritchard, Associate Professor; M.A., Middlebury College
 Guy J. Riccio, Professor; Ph.D., University of Maryland
 Alberto Rosauro, Lieutenant Commander, Brazilian Navy; B.S., Brazilian Naval Academy
 Edward J. Satterthwaite, Associate Professor; A.M., University of California at Berkeley
 Dieter Seebens, Lieutenant Commander, Federal German Navy; German Naval Academy
 Vladimir S. Tolstoy, Assistant Professor; M.S., Georgetown University

Economics Department

Chairman

J. Roger Fredland, Professor; Ph.D., The American University
 Bradley S. Beall, Lieutenant, USN; M.S., Naval Postgraduate School
 David B. Brown, Major, USMC; M.B.A., George Washington University
 Arthur G. Fraas, Assistant Professor; Ph.D., University of California
 Rae Jean Goodman, Assistant Professor; Ph.D., Washington University
 Harley H. Hinrichs, Associate Professor; Ph.D., Harvard University
 Jefferson D. Howell, Jr., Major, USMC; M.A., University of Texas
 Terry A. Ippel, Lieutenant, USNR; M.S.Ad., George Washington University
 William R. Link, Lieutenant, USN; M.B.A., University of Missouri
 Roger D. Little, Assistant Professor; Ph.D., University of Houston
 Clair E. Morris, Jr., Associate Professor; Ph.D., University of Wisconsin
 F. Roland Schenck, Lieutenant, USN; M.B.A., George Washington University
 Kendrick W. Wentzel, Lieutenant, USN; M.S., Naval Postgraduate School
 A. Royall Whitaker, Associate Professor; Ph.D., University of Pennsylvania

Political Science Department

Chairman

John R. Probert, Professor; Ph.D., University of Pennsylvania

George P. Atkins, Associate Professor; Ph.D., The American University

Robert A. Bender, Associate Professor; M.A., Princeton University

Thomas Boyajy, Associate Professor; M.A., Hartford Seminary Foundation

Arthur E. Breisky, FSO-4; B.A., Stanford University

Georgia Clark, Lieutenant Commander, USN; M.P.A., University of Washington

Charles L. Cochran, Associate Professor; Ph.D., Tufts University

John F. Doyle, Lieutenant Commander, USN; M.S., The George Washington University

Robert J. Doll, Lieutenant Commander, USN; M.A., The George Washington University

John A. Fitzgerald, Jr., Associate Professor; Ph.D., University of Chicago

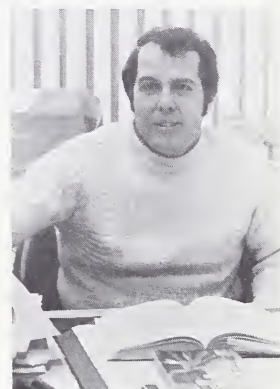
Elmer J. Mahoney, Professor; J.D., University of Maryland Law School

Philip A. Mangano, Associate Professor; J.D., The George Washington University

Rocco M. Paone, Professor; Ph.D., Georgetown University

Robert L. Rau, Assistant Professor; M.A., University of Michigan

Rodney G. Tomlinson, Assistant Professor; M.A., University of Southern California



Associate Professor Cochran

Athletics and Physical Education

Director of Athletics and Head Physical Education Department

John O. Coppedge, Captain, USN (Ret.); M.A., The George Washington University

Deputy Director of Athletics

Donald W. Simons, Captain, USN; B.S., U. S. Naval Academy

Assistant Director of Athletics

Edgar E. Miller; B.S., University of Notre Dame

Executive Officer, Physical Education Department

Robert H. Schmidt, Commander, USN; M.E., Naval Postgraduate School

Deputy Physical Education Officer

Anthony J. Rubino, Professor; B.S., Pennsylvania State University

Physical Education Staff

Gary W. Anderson, Instructor; M.S., Westchester State College

Stanley R. Antrim, Lieutenant, USN; B.S., U. S. Naval Academy



Coach Welsh

David M. Ashmann; B.S., Southern Missouri State
 Bryan J. Bateman, Ensign, USNR; B.S., Indiana University
 Robert E. Bayliss, Instructor; M.A., University of Richmond
 Stephen N. Belichick, Associate Professor; M.A., Western Reserve University
 Steven Bujnovszky, Instructor; M.S., Riding Master Academy, Hungary
 William F. Byrd, III, Ensign, USNR; B.S., University of Washington
 Albert A. Cantello, Assistant Professor; B.S., LaSalle College
 Jack M. Cloud, Assistant Professor; B.S., College of William & Mary
 John M. Connolly, Lieutenant, USN; B.S., U. S. Naval Academy
 Stephen B. Cyriacks; B.A., Dakota State College
 Andre R. Deladrier, Associate Professor; M.A., Columbia University
 Joseph C. Duff, Associate Professor; B.S., West Virginia University
 Mark D. Eaton; B.S., University of New Mexico
 Donald E. Eshleman, Lieutenant, USN; B.S., U. S. Naval Academy
 John H. Fellowes, Commander, USN; B.S., U.S. Naval Academy
 Joseph A. Jockel, Lieutenant Commander, USN; M.A., The American University
 Michael J. Hanna, Instructor; B.A., Hobart College
 Wayne E. Hicks, Lieutenant, USN; B.S., U. S. Naval Academy
 John H. Higgins, Associate Professor; B.S., Ohio State University
 Robert J. Kopnisky, Assistant Professor; B.S., University of Maryland
 Samuel Larsen, Lieutenant, USN; B.S., U. S. Naval Academy
 Lee W. Lawrence, Assistant Professor; M.S., Springfield College
 Heinz W. Lenz, Associate Professor; M.S., Columbia University
 Terrance R. Lewis; B.S., Southern University
 John B. McGinty, Instructor; B.A., University of Richmond
 Terrence P. Murray, Captain, USMC; B.S., U. S. Naval Academy
 Michael C. G. Neer, Ensign, USNR; B.A., Washington & Lee University
 Edwin C. Peery, Associate Professor; B.S., University of Pittsburgh
 Arthur M. Potter, Associate Professor; M.Ed., Springfield College
 Dudley W. Purdy, Jr., Assistant Professor; M.Ed., Pennsylvania State University
 William A. Savering, Assistant Professor; M.Ed., Pennsylvania State University
 Emerson P. Smith, Assistant Professor; B.S., Geneva College
 Richard E. Szlasa, Advanced Instructor; M.Ed., Western Reserve University
 Franklin J. Smith, III, Lieutenant Commander, USN; B.S., U. S. Naval Academy
 Russell H. Sutton, Captain, USMC; M.A., University of Alabama
 Robert D. Thompson, Instructor; B.S., Springfield College
 Floyd H. Warner, Associate Professor; M.Ed., Springfield College
 Thomas E. Williams, Captain, USMC; B.S., U. S. Naval Academy
 John W. Wilson, Lieutenant, USN; B.S., U.S. Naval Academy

Athletic Association Coaches

Thomas M. Bresnahan; M.Ed., Springfield College
 Dennis R. Bussard; M.Ed., Xavier University
 H. Richard Duden, Jr.; B.S., U. S. Naval Academy

Leonard J. Fontes; M.Ed., Eastern Michigan
William J. Haushalter; M.Ed., Indiana University of Pennsylvania
Richard A. Lantz; B.S., Central Connecticut State
Phillip E. Resch; B.S., University of Wisconsin
David P. Smalley; B.S., U. S. Naval Academy
William P. Templin; B.S., Purdue University
Gary F. Tranquill; M.Ed., Wittenberg University
Carl F. Ullrich; B.S., Cornell University
George T. Welsh; B.S., U. S. Naval Academy





XII. Prizes and Awards, Museum, Alumni Association, and the Naval Institute

Prizes and Awards

Each June Week more than 80 prizes and awards, provided by individuals and a wide variety of organizations, are presented to deserving midshipmen in recognition of their noteworthy accomplishments in such areas as academics, leadership, professional studies, debate, public speaking, sailing, marksmanship, and athletics.

The Museum

The Naval Academy Museum serves as an inspiration to the men of the Brigade by providing tangible evidence of some of the most famous and exciting episodes in our nation's history. Its collection of more than 50,000 individual items also provides an important reference source for the teaching of naval history.

While most of the museum's valuable collections are located within the museum, other items of exceptional interest and value are located in the chapel, Bancroft Hall, the library, and in other buildings throughout the Academy. The museum contains some of the finest ship models in the world, including many from the famous Rogers Collection; a superb collection of 13 maritime paintings by Edward Moran; perhaps the largest collection in the world of items relating to the life and work of John Paul Jones; the table from the mess deck of the battleship *Missouri* on which was signed the instrument of surrender ending World War II; and thousands of other sig-



nificant items relating to the history of the Navy, the Marine Corps, and the Naval Academy. In addition, the museum has valuable collections of manuscripts and extensive photographic files.

Museum items in Bancroft Hall include the flag hoisted by Commodore Oliver Hazard Perry at the Battle of Lake Erie on which were emblazoned the immortal words of the dying James Lawrence, "Don't Give Up The Ship!"; an original marble bust of John Paul Jones by Jean Antoine Houdon; and fine portraits of other distinguished naval officers. In the chapel crypt is found John Paul Jones's commission as a captain, signed by John Hancock; his membership certificate in the Society of The Cincinnati, signed by George Washington; and the dress sword presented to him by King Louis XVI of France. Mahan Hall contains a number of ship models from the Rogers Collection and numerous historic flags, including the only known captured British Royal Standard.

The U.S. Naval Academy Alumni Association

The U. S. Naval Academy Alumni Association, Inc., is a private organization whose mission is to serve and support the United States, the naval service, and the Naval Academy by furthering the high standards of the Naval Academy; by seeking out, informing, encouraging, and assisting qualified young men to enter the Naval Academy and to pursue careers in the regular Navy and Marine Corps; and by initiating and sponsoring activities which perpetuate the history, traditions, and growth of the Naval Academy and which bind its alumni together in support of the highest ideals of command, citizenship, and government.

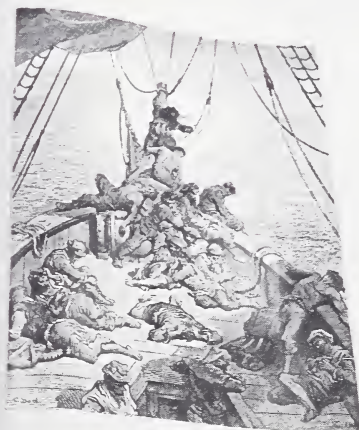
All former midshipmen of the Naval Academy are eligible for membership in the Association—graduates, non-graduates, active duty officers, retired officers, and alumni who are no longer affiliated with the Navy.

Alumni House (Ogle Hall of pre-Revolutionary-Annapolis fame) is the Association's handsome national headquarters. Files and records are maintained on all ex-plebes dating from the establishment of the present Naval Academy in 1845 through the classes now enrolled. The many functions of the Association include annual publication of the *Register of Alumni*; publication of *Shipmate*, the alumni monthly magazine; support of class and chapter organizations; and service to and support of many activities at the Academy throughout the year.

The United States Naval Institute

Headquartered in Annapolis, the U. S. Naval Institute is the professional society of the seagoing services. It is a private, nonprofit association of more than 63,000 members formed in 1873 for "the advancement of professional, literary, and scientific knowledge in the Navy." The membership includes officers and enlisted personnel from all branches of the military services, distinguished officers of foreign navies, and U. S. and foreign citizens interested in events and developments throughout the worldwide maritime community. Members pay annual dues and receive the Institute's monthly professional journal, the U. S. Naval Institute *Proceedings*, and are entitled to purchase Naval Institute books, as well as those of other publishers, at reduced prices.

The Institute's books include texts on professional naval subjects, training guides and manuals, scientific and technical works, and studies in naval history.



Appendix A

Requesting a Congressional Nomination *(Sample letter)*

Honorable _____
House of Representatives
Washington, D. C. 20515

or

Honorable _____
United States Senate
Washington, D. C. 20510

Dear _____

It is my desire to attend the United States Naval Academy. I respectfully request that I be considered as one of your nominees for the class entering in the summer of 197__.

The following personal data are provided for your information:

Full name _____
(Print as recorded on birth certificate)

Name of parents _____

Address: (Use ZIP Code and phone number)

Permanent

Temporary

My date of birth: _____ Place of birth: _____

Social Security Number: _____

High school attended: _____
(Name and address)

Date of high school graduation: _____

My approximate standing is _____ in a class of _____.

I have requested my high school transcript of work completed to date be forwarded to your office as soon as possible. I have also listed on the reverse side the results of any ACT or College Board test scores that I have taken.

I have been active in high school extracurricular activities as indicated on the reverse side.

I should greatly appreciate your consideration of my request for one of your nominations.

Sincerely yours,

(Signature)

Notes: Prospective candidates should apply to their U.S. Representative and to both of their Senators.

If you have not already filled one out, a Precandidate Questionnaire should be requested from the Director of Candidate Guidance, U. S. Naval Academy, Annapolis, Maryland 21402 at the same time that your applications for Congressional nominations are submitted.

Requesting a Presidential Nomination (Sample form)

(This application should be submitted after 1 June of the year preceding desired year of entry.)

To Superintendent, U. S. Naval Academy, ATTN: Candidate Guidance Office
Annapolis, Md. 21402

Dear Sir:

I request a Presidential nomination to the United States Naval Academy for the class which will enter in the summer of 197__ and submit the following data:

Name: _____
(Give full name as shown on birth certificate, or, if changed, attach copy of court order.)

Address: (Use ZIP Code and phone number)

Permanent

Temporary

Date of Birth: _____ Social Security Number _____
(Spell out month) (Must be filled in)

Name and address of high school: _____

Date of high school graduation: _____

If member of military, check box ☐. List rank, serial number, component, branch of service and organizational address on reverse side of this form.

Information Concerning Parent's Military Service.

Name of parent: _____
(Parent's rank, serial number, component, and branch of service)

Sincerely yours,

(Signature)

Note: In establishing your eligibility for a Presidential nomination, you should determine which of the following three service-connected categories applies to your parent, and forward the appropriate documents and information to the Naval Academy along with your letter of application for a nomination.

- ☐ Active duty officer: (Attach statement of service prepared by personnel officer specifying all periods of active duty.)
- ☐ Active duty enlisted: (Attach statement prepared by personnel officer specifying all periods of active duty and listing dates of enlistment and dates of expiration of enlistment.)
- ☐ Retired or deceased: (Furnish date and copy of retirement order or casualty report. If appropriate, include brief statement concerning the date, place and cause of death or the details of disability together with the Veterans Administration Claim Number. If eligible, applicant will be given a nomination in the Sons of Deceased or Disabled Veterans Category.)

I intend to request nominations from the following Members of Congress: _____

The number of the Congressional district in which I plan to apply for a nomination is the _____ located in the state of _____

Appendix B

Special Medical Examination Considerations

The following special medical examination considerations are set forth in order that candidates, prospective candidates, and their private physicians and dentists may know the basic medical requirements for entrance to the Academy:

MEDICAL HISTORY. The medical history will be compiled with particular care, with elaboration where indicated. Inquiries will be made in detail concerning all illnesses, injuries, and operations which candidates may have had. Failure to fully document these items can result in disappointment should related medical disqualification be determined later. A history of familial diseases will be investigated thoroughly. If the candidate has received medical care which has significantly affected his physical condition, he will be required to submit evidence from attending physicians or from hospital records concerning this medical care. *A candidate who has defects that are remedial, including dental defects, should have them corrected prior to taking the Qualifying Medical Examination.*

WEIGHT STANDARDS

Height*	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
Weight:																	
Minimum	103	104	105	106	107	111	115	119	123	127	131	135	139	143	147	151	153
Maximum	174	178	183	187	191	196	202	208	214	219	225	231	237	243	248	254	260

* Waiver for height up to 80 inches may be granted to a limited number of candidates with exceptional scholastic and leadership achievements.

These weight standards are necessarily arbitrary and waivers may be granted in unusual cases. Obesity is disqualifying.

EYES AND VISION. Unaided visual acuity of 20/20 in each eye is a basic requirement. However, waivers may be granted to a limited number of candidates with exceptional scholastic and leadership achievements whose eyes are without excessive refractive errors and will correct to 20/20 with prescription lenses. (Technically, in evaluating the degree of refractive error, the strength of the lens required to correct the vision to 20/20 must not be greater than ± 5.50 diopters in any meridian, there

cannot be more than 3 diopters of astigmatism present, and the maximum difference in power between the eyes may not exceed 3.5 diopters.) Candidates who wear spectacles should take them along when they receive their physical examination.

Both eyes must be free from any disfiguring or incapacitating abnormality and from acute or chronic disease. Candidates wearing contact lenses must remove them at least three weeks prior to reporting for medical examination. Normal color perception is required. Waivers may be granted to a very limited number of candidates with defective color perception who have exceptional scholastic and leadership achievements.

HEART AND VASCULAR SYSTEM: An electrocardiogram is required of all candidates. The following conditions may be causes for rejection, and they require complete medical evaluation: all organic valvular diseases of the heart, including those improved by surgery; EKG evidence of variations from normal heart beat; and hypertension evidenced by predominant blood pressure reading of 140 mm or more systolic or 90 mm or more diastolic. The following are causes for rejection: varicose veins, if severe or symptomatic; heart rate greater than 100 on repeated examinations; substantiated history of rheumatic fever within the previous two years; recurrent attacks of rheumatic fever or evidence of residual cardiac damage; history of recurring rapid heart beat within the preceding five years (paroxysmal tachycardia).

EARS AND HEARING: Auditory acuity of all candidates will be determined. Maximum acceptable hearing loss in decibels is indicated on the following chart:

International Standards Organization (ISO)						
Frequency (hz)	500	1000	2000	3000	4000	8000
	512	1024	2048	2896	4096	8192
Maximum level in decibels in either ear	Average level in these three frequencies not greater than 30 db with no level greater than 35 db in any one frequency			45db	60db	Recorded for baseline information only

Both ears must be free from any disfiguring or incapacitating abnormality and from acute or chronic disease.

NARES: Septal deviation, hypertrophic rhinitis, or other conditions which result in 50 percent or more obstruction of either airway, or which interfere with drainage of a sinus on either side, are causes for rejection.

SKIN: Chronic diseases such as severe acne or eczema or unsightly congenital markings are cause for disqualification. Pilonidal sinus, if evidenced by presence of mass or discharging sinus, is cause for rejection.

SEROLOGIC TESTS: A serologic test for syphilis is required on all candidates. An authentic history of syphilis of any type is cause for rejection without further laboratory procedure.

GENITOURINARY SYSTEM: Persistent or recurrent albuminuria of any type or the persistence of casts in the urine will be cause for rejection. Other causes for rejection: marked phimosis or epispadias; pronounced hypospadias; atrophy, deformity, or maldevelopment of both testes; or an undescended testicle of any degree. Bed wetting persisting into late childhood or early adolescence is cause for rejection.

NEUROLOGICAL EXAMINATION: Evidence of degenerative disorders or conditions such as established migraine and persistent motion sickness are causes for rejection.

ASTHMA: Asthma or recurrent asthmatic bronchitis by diagnosis or history since the age of 12 are causes for rejection.

ABDOMINAL WALL EXAMINATION: Hernia of any type is disqualifying until corrected; history of operation for hernia within past 60 days is disqualifying. Other abnormal diseases and conditions which are not acceptable include stomach or small bowel ulcer or history of same, acute or chronic gall bladder disease, and removal of spleen for reason other than trauma.

MISCELLANEOUS MEDICAL FINDINGS THAT ARE DISQUALIFYING: Acute communicable diseases; anemia; abnormal bleeding states; diabetes mellitus or history of diabetes in both parents; persistent sugar in urine regardless of cause; ununited fractures; history of surgery to a major joint within past six months; history of derangement of knee joint not corrected by surgery, or evidence of instability subsequent to surgery; total loss of either thumb; tuberculosis, active in past five years; hay fever, if severe; nasal polyps; personality disorders; symptomatic immaturity disorders such as stammering or stuttering; arthritis; and herniated nucleus pulposus or history of operation for this condition.

DENTAL STANDARDS: A candidate for appointment must have a minimum of 16 natural permanent teeth, of which a minimum of eight must be in each arch. All missing teeth causing unsightly spaces or significantly reduced masticatory or incisal efficiency must be replaced by well-designed bridges or partial dentures which are in good condition. Except for minor or questionable carious areas, all required dental treatment must be completed. Candidates undergoing active orthodontic treatment will be temporarily disqualified. Each such applicant will be considered on an individual basis by the Service Academies Central Medical Review Board. Disqualifying defects are as follows:

Lack of satisfactory incisal or masticatory function.
Less than eight natural permanent teeth in each arch.
Edentulous spaces which are unsightly or which significantly reduce masticatory function.
Carious teeth, except minor or questionable carious areas.
Infections or chronic diseases of the soft tissue of the oral cavity.
Marked malocclusion resulting in severe dentofacial deformity.
Unsatisfactory restorations, bridges, or dentures.
Severe or extensive apical or periodontal infection.
Perforations from the oral cavity into the nasal cavity or maxillary sinus.
Tumors or cysts of the oral tissues which require treatment or may require treatment in the foreseeable future.

PHYSICAL APTITUDE EXAMINATION: The physical aptitude examination includes sit-ups, pull-ups, arm-hang, squat-walk, and related exercises. It is not part of the medical examination conducted by Navy medical examining centers; however, physical aptitude examinations conducted by the other services as part of their medical examination are acceptable to the Naval Academy.

The Naval Academy physical aptitude examination may be administered by a high school coach or physical education instructor. The details of this examination are provided to the candidate along with a testing form, with notification of nomination. The testing form is to be completed and returned to the Dean of Admissions, U. S. Naval Academy, Annapolis, Maryland 21402.

Appendix C

Foreign Students

REPUBLIC OF THE PHILIPPINES. On behalf of the President of the United States, the Secretary of the Navy may authorize up to four Filipinos at any one time to receive instruction at the Naval Academy. Applications for these appointments must be addressed through diplomatic channels. The appointments are competitive.

AMERICAN REPUBLICS OTHER THAN THE UNITED STATES. Upon designation by the President of the United States, the Secretary of the Navy may authorize up to 20 persons at any one time from other American nations to receive instruction

at the U. S. Naval Academy. Not more than three persons from any one country may receive instruction at the same time. Applications for these appointments must be addressed through appropriate diplomatic channels. The appointments are competitive. Nominations must reach the Superintendent, U. S. Naval Academy, Attn: Candidate Guidance Office, by 1 January of the calendar year in which entering.

Foreign nationals receiving instruction at the Naval Academy receive the same pay, allowances, and emoluments as other midshipmen; are paid from the same appropriations; and except for such modifications as may be determined by the Secretary of the Navy, are subject to the same rules and regulations governing admission, attendance, discipline, resignation, discharge, dismissal, and graduation, as midshipmen at the Naval Academy appointed from the United States. Foreign students are not entitled to appointment to any office or position in the U. S. Navy by reason of their graduation from the Naval Academy. The entrance deposit in the amount of \$300 is required of all foreign students.

Each foreign candidate must:

- ☐ Be an unmarried, bona fide male citizen of the nominating country and, unless otherwise approved by the Secretary of the Navy, be not less than 17 and not yet 22 years of age on 1 July of the calendar year in which he enters the Naval Academy.
- ☐ Possess medical qualifications as specified in Appendix B of this catalog. After their arrival in the United States, all candidates must undergo a Qualifying Medical Examination by a board of medical examiners designated by the Chief of Naval Personnel. Foreign candidates are urged to undergo careful preliminary examination by qualified medical personnel who are conversant with the physical requirements set forth in Appendix B of this catalog before leaving their homes for the Naval Academy. Those with obviously disqualifying defects may thus be spared the needless expense of the trip to Annapolis. In case of reasonable doubt as to whether or not the defects are disqualifying, it is recommended that a telegraphic inquiry be addressed to the Dean of Admissions, U. S. Naval Academy, Annapolis, Maryland, 21402, U.S.A.
- ☐ Be proficient in reading, writing, and speaking idiomatic English. Candidates may meet scholastic entrance requirements by submitting certificates from schools attended. They must also take either the American College Testing Program (ACT) test or the College Entrance Examination Board Scholastic Aptitude Test (SAT). Due consideration is given to the fact that these tests are prepared in the English language and not in the native tongue of the candidate.

The naval attaché or a diplomatic representative of the United States in the candidate's country must provide a report of the candidate's proficiency in the use of idiomatic English.

Governments should submit the names of candidates as early as possible in order that they may qualify for entrance by the end of April and enter the Naval Academy in July.

In lieu of the oath of allegiance to the United States, a substitute oath will be required, in substance as follows:

I, a citizen of
having been appointed a midshipman at the United States Naval Academy, do solemnly swear to comply with all regulations for the policy and discipline of the Naval Academy, and to give my utmost efforts to accomplish satisfactorily the required curriculum; do swear not to divulge any information of military value which I may obtain directly or indirectly in consequence of my presence at the United States Naval Academy to any alien government; and do agree that I shall be withdrawn from the United States Naval Academy if deficient in conduct, health, or studies.

Notification will be given to the governments concerned that students found by proper authority to be unsatisfactory in conduct, studies, or health will be accorded the same consideration given to other midshipmen regarding withdrawal from the Academy or repetition of a year's work.

Appendix D

Oath of Office and Entrance Day Procedures

Candidates for whom there are vacancies, who have subscribed to the *Engagement to Serve*, and who have met the scholastic, moral, and physical requirements, will receive appointments as midshipmen and be admitted to the Naval Academy.

Each candidate for midshipman will be required to take the following oath of office upon entrance:

"I,, having been appointed a midshipman in the United States Navy, do solemnly swear (or affirm) that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter; So Help Me God."

You will take the oath by holding up your right hand and swearing that you voluntarily bind yourself by its terms. You will also sign your name as a record to your oath. This must not be a perfunctory procedure in any sense, and you should consider carefully and understand thoroughly the obligation that will become yours.

He will also be required to subscribe to the following agreement under oath:

"For and in consideration of the privileges, opportunities, and benefits afforded me during the continuance of my service as a midshipman, I agree to and with the Superintendent of the United States Naval Academy, as follows:

"First: To enter the service of the Navy of the United States and, to the utmost of my power and ability, to be in everything conformable and obedient to the several requirements and lawful commands of the officers who may be placed over me.

"Second: I oblige myself, during such service, to comply with and be subject to the Uniform Code of Military Justice and such other laws and regulations as are or shall be established by the Congress of the United States or other competent authority.

"Third: To submit to treatment for the prevention of smallpox, typhoid (typhoid prophylaxis), and to such other preventive measures as may be considered necessary by naval authorities."

Candidates are usually sworn in as midshipmen on the day they are accepted for admission, i.e., the date of reporting to the Naval Academy as designated in the *Permit to Report* issued by the Superintendent, U. S. Naval Academy. Living accommodations in the city of Annapolis are limited, and candidates are therefore urged to time their arrivals in Annapolis to coincide as closely as possible with the reporting time and date, keeping in mind, however, that transportation facilities between Washington and Annapolis and between Baltimore and Annapolis are not unlimited.

Midshipmen who are involuntarily separated from the Naval Academy prior to repayment of the entrance credit, are required to turn in all articles of uniform and

equipment deemed suitable for reissue, to an amount sufficient to liquidate their indebtedness. If reclaimed articles are insufficient to cover the indebtedness, parents will be given an opportunity to pay the remaining debt; failing this, the remainder of the debt is cancelled. Midshipmen applying for voluntary separation for their own convenience are required to repay in full the amount of indebtedness prior to separation.

Every candidate must present his Social Security card upon reporting for appointment. If an individual has not obtained a Social Security number as a result of work experience prior to entering, he should obtain one based on the length of expected employment as a midshipman.

Upon entrance, midshipmen will be required to obtain a regulation entrance outfit from the midshipmen's storekeeper. Slide rules and drawing sets are included in the outfit. Candidates are advised, therefore, not to purchase these items prior to entering the Academy.

After being admitted to the Naval Academy, midshipmen receive travel and transportation allowances as prescribed in Joint Travel Regulations (ordinarily, mileage allowance of 6 cents per mile for authorized travel). Midshipmen will be reimbursed for the actual cost of their fares in commercial ships provided no government transportation was available. In those cases in which travel originates outside the United States, candidates must contact the nearest naval activity for information as to the availability of government transportation before endeavoring to procure commercial transportation. When government transportation is not available, a certified statement to this effect must be presented in order for the candidate to be reimbursed after he has become a midshipman.

Shortly after entrance, each midshipman (except foreign nationals) will be required to complete a Statement of Personal History. Candidates should be prepared to furnish such information as:

Names and locations of all schools attended.

Family names, dates and places of birth of parents, service data if parents are or were in armed forces; naturalization numbers of parents if applicable.

Relatives in foreign countries—relationship and location.

Names and addresses of former employers.

Names and addresses of three credit and five personal references (credit references may include those of parents).

Residences during past 15 years. (Dates, street addresses, and cities are required.)

Candidates admitted as midshipmen will be required to submit documentary evidence of birth to the Superintendent, U. S. Naval Academy. A certified copy of

the public record of birth is the best evidence. Supporting evidence will be required if the name on the evidence of birth is not identical with the name of the candidate. Except for candidates entering the Academy as citizens of certain foreign countries, as provided by law, all candidates born outside the United States must show proof of U. S. citizenship.

Appendix E

Naval Academy Information Program

NAVAL ACADEMY INFORMATION OFFICERS, commonly known as Blue and Gold Officers, are Naval Reserve officers located throughout the country who have received specialized training in the Naval Academy admission procedures. These officers are not on active duty but are in contact with officials at Annapolis throughout the year. Anyone interested in receiving counseling assistance from a Blue and Gold Officer may write or call the nearest Naval Academy Information Officer State Coordinator.

State Coordinators

ALABAMA

Commander Rudolph Ohme, Jr.
2732 Forsyth Lane
Montgomery, Alabama 36111
Phone: 205-288-7384

ALASKA

Lieutenant Commander Donald G. Kaiser
P. O. Box 918
Anchorage, Alaska 99510
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Appendix F

Naval and Marine Corps Officers' Graduate Education Programs

The vast majority of Annapolis graduates go directly to sea or to the Fleet Marine Force, thus beginning their professional careers in an operational environment. A few, those with outstanding records as midshipmen, may compete for a limited number of graduate scholarships. Several of these scholarships require enrollment immediately upon graduation from the Academy. Most graduates, however, will first complete their initial operational tour of duty with the Fleet before they may expect the opportunity to be enrolled in a masters program, either at the Naval Postgraduate School in Monterey, California, or in programs offered at a number of participating civilian universities. Still others will have the opportunity to undertake graduate studies at a later time in their careers.

JUNIOR LINE OFFICER ADVANCED SCIENTIFIC EDUCATIONAL (BURKE) PROGRAM

The Burke Program is open to 15 qualified midshipmen each year, 13 in the fields of science or engineering and two in the field of political science. Officers who demonstrate superior academic ability and potential may be authorized to continue their education beyond the master's to the attainment of a Ph.D. degree.

Although selected as midshipmen, graduates complete an initial operational tour of two to four years as officers prior to reporting to the civilian educational institution of their choice.

SCHOLARSHIP PROGRAM

Nationally known scholarships or fellowships are available to qualified graduates of the Naval Academy. Graduate studies may be pursued in various fields and in several countries while receiving pay as a commissioned officer in the Navy or Marine Corps. Among programs for which midshipmen have been selected in recent years are the following:

Scholarship	Degree Attainable
Guggenheim	M.S./Ph.D.
National Science Foundation	M.S./M.A./Ph.D.
Rhodes	various
Olmsted	various
Fannie & John Hertz	various

In addition, each year, a few highly qualified graduates apply directly to various graduate schools and are awarded scholarships.

NAVAL POSTGRADUATE SCHOOL, MONTEREY

Among the graduate programs currently offered, all of which lead to a Master of Science degree, are:

Aeronautical Engineering	Mechanical Engineering
Applied Mathematics	Meteorology
Communications Engineering	Nuclear Science (Effects)
Computer Science	Oceanography
Computer Systems Management	Operations Research
Electrical Engineering	Physics
Engineering Acoustics	Physics (Air/space, Electro-optics or Missile dynamics)
Engineering Electronics Management	

It is worth noting that these graduate programs offer considerably more depth than do most study opportunities offered employees by private industry.

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Calendar

1974-75

July 8	Monday	Class of 1978 enters.
August 23-25		Parents' Open House, Class of 1978.
September 2	Monday	Labor Day, holiday.
September 4	Wednesday	Leave and summer training expire for three upper classes.
September 9	Monday	First semester begins.
October 26	Saturday	Homecoming.
October 14	Monday	Columbus Day, holiday.
October 28	Monday	Veterans' Day, holiday.
Oct. 7, 8, 10, 11		Preregistration for second semester.
November 13	Wednesday	Service selection, first class.
November 28	Thursday	Thanksgiving Day, holiday.
November 30	Saturday	Brigade at Army-Navy game, Philadelphia.
December 14	Saturday	Graduate Record Examination, first class.
December 19	Thursday	Christmas leave begins after last scheduled class or military duty.
January 7	Tuesday	Christmas leave ends.
January 8	Wednesday	Classes resume.
January 17-25		Examinations.
		Leave begins after last scheduled examination or military duty.
January 27	Monday	Leave ends.
January 28	Tuesday	Second semester begins.
February 17	Monday	Washington's Birthday, holiday.
Mar. 19-21		Preregistration for first semester, 1975-76.
March 26	Wednesday	Spring leave begins.
March 30	Sunday	Easter Sunday.
March 31	Monday	Spring leave ends.
May 1-9		Registration for first semester, 1975-76.
May 15-24		Examinations.
		Leave begins after last scheduled examination or military duty.
May 26	Monday	Memorial Day, holiday.
May 27	Tuesday	Leave ends for three junior classes.
May 28	Wednesday	Leave ends for first classmen.
May 30	Friday	June Week begins.
June 4	Wednesday	Graduation.

This catalog should not be considered a contract between the U.S. Naval Academy and any prospective candidate. The curriculum, policies, and dates are subject to change to meet varying requirements of the Navy.

Check-Off Calendar for Candidates

All prospective candidates should carefully read chapter 5 (Admissions) and the related appendices of this catalog to ensure that they fully understand the Naval Academy's admission procedures. The following check list calls attention to certain key facts and dates. It is not intended as a substitute for the more detailed information in chapter 5.

1974

23 February. American College Testing Program (ACT) test.

Spring. Of *junior* year. Write your U. S. representative and your two U. S. senators requesting a nomination. Although many congressmen will accept later requests, some into the early months of your senior year, others select their nominees much earlier. Write early to ensure consideration. Submit Precandidate Questionnaire to the Naval Academy.

6 April. CEEB tests. SAT only.

27 April. ACT test.

4 May. CEEB tests. Achievement only.

1 June. Prospective candidates commence taking scheduled medical examinations at designated military medical examining centers. Each is individually notified of the time, date and place to report for this examination by the Department of Defense Medical Review Board (Colorado).

1 June–15 December. If eligible (as explained in chapter 5), write the Superintendent, U. S. Naval Academy (Attn: Candidate Guidance Office) requesting presidential and/or other service-connected nominations. Early requests are encouraged. Requests received after the administrative deadline of 15 December are considered.

15 June. ACT test.

22 June. CEEB tests. SAT only.

Beginning in July. At the request of their congressman, certain prospective candidates may be required to take a special screening examination provided by the U. S. Civil Service Commission. Many congressmen use this means to help them select their nominees.

14 July. CEEB tests.

21 July. ACT test.

1 September. Deadline for receipt by the Vice President of requests for vice presidential nominations. Apply only if you believe you have an outstanding record, since the competition is nationwide. Use congressional letter format, appendix A, as guide.

12 October. CEEB tests. SAT only in California and Texas.

15 October. Beginning on this date, early offers of appointment are made by the Naval Academy to outstanding candidates. Offers continue into the following spring as admissions files of candidates are completed and additional outstandingly well qualified candidates are identified.

19 October. ACT test.

2 November. CEEB tests. SAT only.

23 November. CEEB tests. Achievement only.

7 December. CEEB tests. SAT only.

14 December. ACT test.

1975

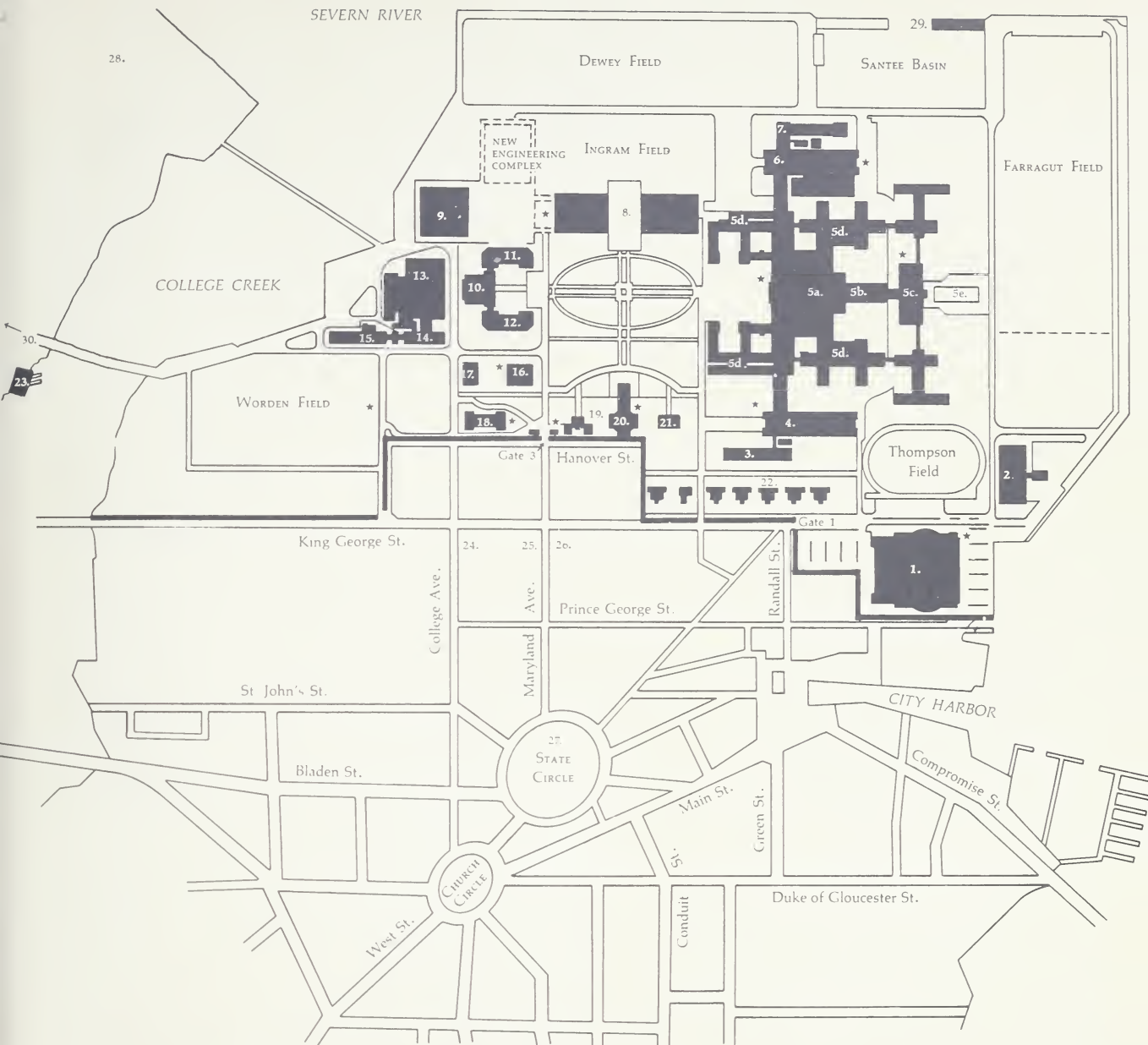
11 January. CEEB tests. Achievement only.

1 February. CEEB test. SAT only.

22 February. ACT test.

1 May. With but *very* few exceptions, all candidates will have been notified on or before this date whether or not they have been accepted for entry.

7 July. Class of 1979 reports to Naval Academy and takes the oath of office as midshipmen.



- | | | |
|-----------------------------------|-----------------------------|--|
| 1. Halsey Field House | 9. Nimitz Library | 22. Officers Housing |
| 2. Enlisted Men's Barracks | 10. Mahan Hall | 23. Hubbard Hall |
| 3. Ward Hall | 11. Maury Hall | 24. Alumni House |
| 4. Dahlgren Hall | 12. Sampson Hall | 25. Chase-Lloyd House |
| 5. Bancroft Hall | 13. Isherwood Hall | 26. Hammond-Harwood House |
| 5a. Rotunda and Memorial Hall | 14. Griffin Hall | 27. State House |
| 5b. Mess Hall | 15. Melville Hall | 28. Forest Sherman Field |
| 5c. Mitscher Hall | 16. Preble Hall | 29. Robert Crown Center (under construction). |
| Chaplain Center and Assembly Area | (Museum) | Sailing activities, including Intercollegiate |
| 5d. Eight Dormitory Wings | 17. Leahy Hall | Sailing Hall of Fame |
| 6. Macdonough Hall | 18. Officers/Faculty Club | 30. To Picnic Area, Lawrence Field, Gate 8, etc. |
| 7. Luce Hall | 19. Administration Building | ★ Rest Rooms |
| 8. Michelson Hall | 20. Chapel | |
| 8. Chauvenet Hall | 21. Superintendent's House | |



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